The Newspaper of Information Systems Management
September 13, 1993, Vol. 27, No. 37, 148 Pages, $6/Copy, $48/Year

COMPUTERWORLD

WITH THIS ISSUE: CW's 1993 PREMIER 100

LAN-to-host networking

SNA link pits Novell vs. Microsoft

By Elisabeth Horwitt

■ NetWare users with heavy IBM host connectivity needs could reap some big cost/performance benefits once Microsoft Corp. ships its challenge to Novell, Inc. in the Systems Network Architecture gateway market.

SNA Server, which is due to ship next month, is a Microsoft NT Advanced Server version of a 3-year-old OS/2 product co-developed with Digital Communications Associates, Inc. It offers functionality the same as or better than Novell's NetWare for SAA product at about one-fifth the price, claimed one beta-test user and Othniel Palomino, Microsoft product manager.

For example, one copy of SNA Server, priced at $6,000, is said to support more than 500 host sessions on up to 50 hosts. In contrast, it takes two copies of NetWare for SAA, for a total cost of about $30,000, to support 500-plus sessions, Novell conceded. Plus, Novell's gateway currently provides links to only two hosts.

SNA link, *page 12*

IBM to skirt Windows

By Ed Scannell

In an effort to sever its last tie with Microsoft Corp., IBM is working on an integration technology that would emulate Windows, freeing IBM from the royalties it now pays to Microsoft on every copy of OS/2 sold.

The project, which sources said they expect to be finished by year's end, could mean significant savings for IBM. It could also give the company the leverage it needs to more aggressively price OS/2.

Selected developers got their first look at the code last week, sources close to IBM said.

IBM is in no way attempting to completely reverse-engineer Windows to accomplish its goal. Instead, the integration technology, once installed on a PC, will identify the Windows code and the hardware it is running on and seamlessly integrate the code with OS/2. The technology may be built into a shrink-wrapped version of OS/2 or electronically distributed to user sites.

IBM has been paying Microsoft about $20 for every copy of OS/2 sold.

"What they have figured out how to do is tweak the major executables within Windows,"

IBM, *page 20*

Not a pretty view

Windows has matured, but pesky bugs, a lack of robust network management tools and a dearth of experts are hindering one shop's rollout.

See story page 107.



Client/server limits stall retailer

By Kim S. Nash
SEATTLE

As Microsoft Corp. prepares to unveil its SQL Server for Windows NT database later this month, at least one major beta-test customer has tripped over problems it has encountered building a critical client/server application that uses the technology.

Nordstrom, Inc., a $3.2 billion retailer here, has hit the ceiling trying to scale up a departmental client/server merchandising system built with Microsoft's Visual Basic.

Technology tussle

Nordstrom's client/server effort was snagged by a lack of administration utilities. Possible resolutions would be to:
- Make do with limited utilities built into Microsoft products.
- Buy third-party utils.
- Build tools in-house.
- Delay companywide implementation until Microsoft improves Windows NT utilities.

A lack of middleware to link NT to IBM's DB2 has held up plans to grow a multimillion-dollar, Windows NT-based decision-support system from a small pilot in Oregon to 900 users companywide, according to sources inside and outside of Nordstrom.

Sticking to it

Yet the retailer presses on, with no plans to abandon the mission-critical application. "There may be trouble — there always is when you're trying something new. But we're trying to work it out," said Dave Benton, head of systems services.

Historically cutthroat, the retail industry is becoming more so as the recession wears on. To stay competitive, Nordstrom must move

Retailer, *page 28*

Feds to downsize with IT

Gore report highlights technology projects

By Gary H. Anthes
WASHINGTON D.C.

Information technology will play a central role in streamlining federal bureaucracy and improving public services, according to the Clinton administration's "reinventing government" plan revealed last week.

The report, a by-product of the six-month National Performance Review led by Vice President Al Gore, calls for wide deployment of networks, on-line databases and citizen-accessible applications intended to create an "electronic government" in which federal agencies establish digital links with one another and with the public.

"We are determined to move from an Industrial Age government to an Information Age government, from a government preoccupied



Treasury Dept.'s James Flyzik: *The National Performance Review team will showcase information technology 'because we have a champion in the vice president'*

Feds, *page 16*

Newspaper
#8XBBJFT########## 5-DIGIT 48103
#UIU72E30OM099039# 0120109268
UNIVERSITY MICROFILMS INT ** 0885
UNIVERSITY MICROFILMS INT 6 XC
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

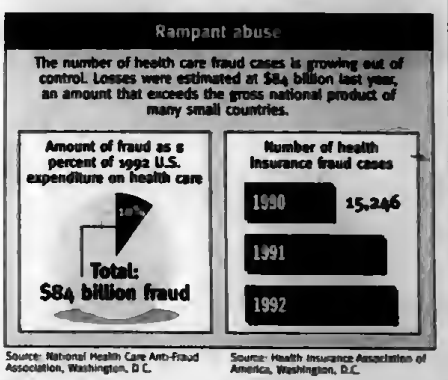
Health fraud: Computers at war

By Mitch Betts
WASHINGTON, D.C.

Sometimes, computers are part of the problem. In the 1980s, a man and his sons looted $16 million from Medicaid by programming their medical clinic's computer to generate phony claims for nearly 400,000 phantom patient visits.

But in a case of fighting fire with fire, computers can also be part of the solution to the nation's $84 billion problem with medical billing fraud and abuse. Many insurance

Health fraud, *page 14*

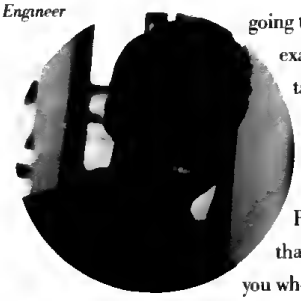


SECOND CLASS



There was a time you couldn't expect onsite service if your site was as remote as this.

Jay Pancost
IBM Customer Engineer



To IBM Customer Engineer Jay Pancost, going the extra mile often means exactly that. His service calls take him to homes and offices from the Grand Canyon to the Hopi and Navajo reservations. "When you buy a PC," he says, "the company that made it should be there for you when you need them. I like the idea of a job where people are always glad to see me, even if they're sometimes surprised I would go so far off the beaten path." Wherever you may be, there are more than 10,000 IBM service representatives like Jay Pancost, in over 1,600 locations nationwide, at your service. Right where you want them.

If you've ever bought computers "direct," we want you to know one important thing.

This time, it can be different.

IBM PC Direct

We're putting the personal in personal computing.



This time it's

L-R: Alice Robinson, Gregg McGhee, Jeff Herman and Beverly Whitman, Custom Build Technicians, IBM Personal Computer Company



425SX/Si

ValuePoint Si

- Newest entry-level member of the ValuePoint family
- Compact size: 14.2"W x 4.8"H x 16.6"D
- VESA Local Bus Video
- 3 slots and 3 bays
- Choice of IBM Keyboard (Basic†† or Enhanced)
- A great, low-cost network client
- IBM HelpWare service and support

ValuePoint SpaceSaver

- Compact size: 14.2"W x 4.8"H x 16.5"D
- 3 slots (includes 1 VESA Local Bus slot) and 3 bays
- Also available in medialess (no drives) configuration to function as an economical LAN client workstation



425SX/S

ValuePoint Desktop

- Plenty of room to grow: 5 slots (includes 1 VESA Local Bus slot), 5 bays
- A super combination of speed, power, upgradability and expandability



433DX/D

Prices may be even lower!
Call us today for the latest quote

ValuePoint Mini-Tower

- Convenient, compact Mini-Tower processor case measures 9.5"W x 16.8"H x 16.9"D
- Enormous room for growth: 8 slots (includes 1 VESA Local Bus slot), 6 bays
- Perfect format for high-powered computing (CAD/CAM, graphics, multimedia, etc.) or as a low-cost network server

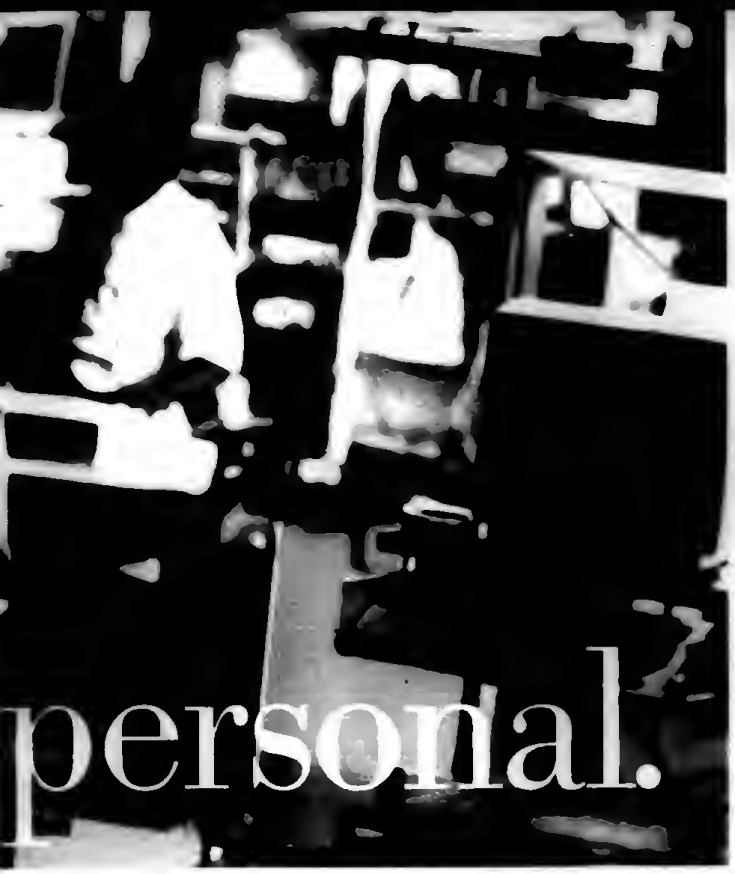


466DX2/T

IBM PC Direct

We're putting the personal in personal computing.

*IBM prices only. The offerings, prices and products are subject to change or withdrawal without prior notice. Products you acquire may not be covered under any existing Volume Purchase Agreement. The same offerings and products may be available through IBM Authorized Remarketers. Remarketer prices may vary. Shipping and handling charges are extra. **IBM Credit Lease prices are quoted for 36-month terms. Lease rates quoted are good through 10/31/93 after which time rates are subject to change without notice. Lease available to qualified commercial customers only. †6312 monitor depicted in photograph is currently sold out. Prices listed reflect the new IBM 14V monitor (see details in chart on next page). ‡ Copies of warranty and 30-day money-back guarantee information available through IBM and IBM Authorized Dealers. Please



IBM

If you don't see it here, call us. We'll custom build a system just for you!

It's a personal commitment from Alice, Gregg, Jeff, Beverly and their associates at the IBM Personal Computer Company. Thousands of IBM people — many working around the clock — to keep you personally delighted with everything we do for you.

It starts—but doesn't end—with our hot-selling IBM ValuePoint™ PCs. Take a closer look at the systems shown here. Super PCs. Super prices. But if you don't see the system you want, call us. We'll build your PCs to your specifications—and your budget.

Remember, ValuePoint is backed by IBM HelpWare®, including our 30-day moneyback guarantee. No qualms. No quibbles. No questions asked.[1] And for one year with free around-the-clock telephone assistance and fast onsite service (even in the most remote locations!) from more than 10,000 IBM service representatives in over 1,600 locations nationwide.[2]

Call us today. And discover how we're putting the personal in personal computing.

All ValuePoint SpaceSaver, Desktop and Mini-Tower systems listed at right feature:††

- Intel® i486™ processors
- SVGA VESA Local Bus Video
- Upgradability via Intel OverDrive™ technology all the way up to Pentium™ [3]
- 101-key IBM Enhanced Keyboard and IBM Mouse
- Zero Insertion Force (ZIF) socket for fast, easy processor upgrades
- A 32-bit VESA Local Bus slot for local bus speed on SCSI drives and other peripherals
- IBM HelpWare

	ValuePoint Si – NEW!	ValuePoint SpaceSaver	ValuePoint Desktop	ValuePoint Mini-Tower
Features	**425SX/Si**	**425SX/S**	**425SX/D**	**433DX/T**
Processor	i486SX/25 MHz	i486SX/25 MHz	i486SX/25 MHz	i486DX/33 MHz
Hard Drive/Memory	120MB/4MB	120MB/4MB	120MB/4MB	340MB/4MB
Diskette	3.5"	3.5"	3.5"	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	6318 14" SVGA NI
Operating System	IBM DOS & WINDOWS™	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS
Price* / IBM Credit Lease**	**$1,539** / $56 per month	**$1,649** / $60 per month	**$1,709** / $62 per month	**$2,459** / $89 per month
Features	**425SX/Si**	**433SX/S**	**433DX/D**	**433DX/T**
Processor	i486SX/25 MHz	i486SX/33 MHz	i486DX/33 MHz	i486DX/33 MHz
Hard Drive/Memory	212MB/4MB	120MB/4MB	120MB/4MB	340MB/8MB
Diskette	3.5"	3.5"	3.5"	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI
Operating System	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS	OS/2®
Price* / IBM Credit Lease**	**$1,699** / $62 per month	**$1,799** / $65 per month	**$2,059** / $74 per month	**$2,879** / $97 per month
Features	**433DX/Si**	**433SX/S**	**433DX/D**	**466DX2/T**
Processor	i486DX/33 MHz	i486SX/33 MHz	i486DX/33 MHz	i486DX2/66 MHz
Hard Drive/Memory	120MB/4MB	245MB/4MB	340MB/4MB	527MB/4MB
Diskette	3.5"	3.5"	3.5"	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	6318 14" SVGA NI
Operating System	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS
Price* / IBM Credit Lease**	**$1,889** / $68 per month	**$1,959** / $71 per month	**$2,379** / $86 per month	**$3,149** / $114 per month
Features	**433DX/Si**	**433DX/S**	**466DX2/D**	**466DX2/T**
Processor	i486DX/33 MHz	i486DX/33 MHz	i486DX2/66 MHz	i486DX2/66 MHz
Hard Drive/Memory	212MB/4MB	245MB/8MB	340MB/8MB	527MB/4MB
Diskette	3.5"	3.5"	3.5"	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 15V 15" SVGA FS NI	IBM 15V 15" SVGA FS NI	6319 15" SVGA FS NI
Operating System	IBM DOS & WINDOWS	OS/2	OS/2	IBM DOS & WINDOWS
Price* / IBM Credit Lease**	**$2,049** / $74 per month	**$2,509** / $91 per month	**$3,069** / $111 per month	**$3,319** / $120 per month

*ValuePoint Si systems do not include all features listed at left. Please refer to product details listed at far left, or call for more information. ValuePoint Si prices listed above reflect IBM Basic Keyboard only. IBM Enhanced Keyboard available at additional cost.

FREE!

The IBM PC Direct™ Source Book. ValuePoint, ThinkPad®, peripherals, add-ons, popular software... it's all here and it's all yours for the asking. Call 1 800 IBM-2YOU today!



Call 1 800 IBM-2YOU

refer to: IKU

1 800 426-2968
8am-midnight M-F, EDT
8am-7pm Sat., EDT

Purchase order is available for qualifying customers.



all 1 800 426-2968 for details regarding IBM's moneyback guarantee and limited warranty. 2. At no additional charge during warranty period. Onsite service available Monday-Friday 8am-5pm in your time zone. APPLIES TO IBM DIRECT SALES ONLY. 3. Upgradable with Intel's future OverDrive processor based on Pentium technology. IBM, HelpWare, ThinkPad and OS/2 are registered trademarks and ValuePoint is a trademark of International Business Machines Corporation. Intel and Intel Inside logo are registered trademarks and i486, Pentium and OverDrive are trademarks of Intel Corporation. Windows is a trademark of Microsoft Corporation. PC Direct is a trademark of Ziff Communications Company and is used by IBM under license. ©1993 International Business Machines Corporation.

A PUBLICATION OF IDG

Table of Contents

September 13, 1993

NEWS

■ **Microsoft** marshals support for Plug and Play. *Page 2*

■ **IBM** remodels AS/400 for client/server. *Page 4*

■ **Sun** seeks improved horsepower in server clusters. *Page 4*

■ Women IS executives confirm that the gender gap is narrowing but say prejudice persists. *Page 6*

■ James Cannavino outlines IBM's hopes for a return to PC software business. *Page 7*

■ **KnowledgeWare** moves to expand its mainframe ADW I-CASE tools into the client/server arena. *Page 8*

■ Alabama auditor's office invests big in pen computing. *Page 8*

■ **Banyan** promises a key storage management piece of its network services strategy. *Page 10*

■ **Novell** to manage remote users' access to corporate LANs. *Page 12*

DESKTOP COMPUTING

■ **PC-Kwik Corp.** unveils a utility to protect DOS 6.0 users from data loss due to cross-linked files. *Page 37*

■ **IBM PC Co.** coddles large PS/2 customers with Premium Partners program. *Page 37*

WORKGROUP COMPUTING

■ Peer-to-peer technology doesn't excite IS managers. They'll only buy if the product looks and acts like a server. *Page 49*

■ You can get low-cost videoconferencing on Unix workstations, but only if you're ready to build it yourself. *Page 49*

ENTERPRISE NETWORKING

■ **AT&T** wants your wide-area network business and is enhancing and expanding its offerings to get it. *Page 61*

SPECIAL REPORT

WORLD SEVENTH ANNUAL COMPUTER JOB SATISFACTION SURVEY 1993

■ **Two-thirds of IS managers say they are not working to their full potential, according to *Computerworld*'s seventh annual Job Satisfaction Survey. Reasons: lack of corporate direction, out-of-date skills and poor communication, say the 781 persons polled. *Page 97*.**

LARGE SYSTEMS

■ Companies with lots of distributed systems are developing practical methods of managing the scattered herd. *Page 71*

APPLICATION DEVELOPMENT

■ **Liant** tool enables development of code portable across multiple environments. *Page 83*

IN DEPTH

■ Installing Windows 3.1 on an enterprise network is no cakewalk, says Brien Boland. *Page 107*

CAREERS

■ Advice on how to get started with client/server from someone with a two-year head start. *Page 113*

MARKETPLACE

■ **IBM**'s Customer Service Agreement may seem simple, but you still have to pay close attention to the terms and related documents. *Page 123*

COMPUTER INDUSTRY

■ **McAfee Associates** looks beyond its virus-fighting niche. *Page 131*

COMMENTARY

■ Charles Babcock sees promise for a satisfactory union of SQL and objects in hybrid products such as UniSQL and OpenODB. *Page 6*

■ We're approaching the limits of absurdity with PC miniaturization, writes Harvey Newquist. *Page 33*

■ If government regulators move from auditing data files to dictating program specs, says Esther Dyson, we'll get software mediocrity. *Page 33*

■ **IBM** hung tough with OS/2 and has come back with a much improved Version 2.1, writes Paul Gillin, but **Microsoft** still holds a lot of the cards. *Page 41*

■ Subnotebooks are ideal for convenience users, says Jeffrey Henning. *Page 44*

■ Remote procedure calls aren't the only alternative for distributed applications, says Franco Vitaliano. Message passing can be a better route. *Page 54*

■ Re-engineering isn't a single process, Beth Gardner explains. It's a whole collection of improvement techniques. *Page 94*

QUOTE

"Health care costs are like a water balloon. Push on one side, and it pokes out the other."

— Marcia Radosevich, President Health Payment Review

UNQUOTE

Calendar ..... *Page 106*

Company Index ..... *Page 129*

Editorial/Letters to the editor ..... *Page 32*

Friday Stock Ticker ..... *Page 130*

Executive Briefing

Information technology is expected to play a leading role in the Clinton administration's attempt to re-engineer government *(Page 1)*, but some governmental entities aren't waiting for the starting gun. The computer technology center at the U.S. House of Representatives has already enhanced its existing host-based Member Information Network with a new client/server-based system that provides easier and faster access to multiple databases. *Page 61*

In the business sector, a number of companies are looking to distributed systems as a growth aid. **Edward D. Jones & Co.**, a $550 million, privately held brokerage firm in Maryland, is moving to client/server to facilitate a 400-office expansion. *Page 53* And **Snapple Beverage Corp.**, which soared to the top tier of the beverage industry, is building a PC-based network equipped with EDI and MRP. Its goal: Better competitive armor in the form of tighter links with bottlers, packagers and distributors. *Page 74*

As **Nordstrom, Inc.** can attest, however, such transitions can be bumpy and frustrating. The company is on hold with plans to expand a pilot client/server merchandising system across the enterprise. Tie-up: Lack of middleware to connect NT to **IBM**'s DB2. *Page 1* Nordstrom plans to soldier on, and that's what many firms are also doing as they hit rocky patches with distributed systems. **Tektronix, Inc.**, **Sandia National Labs** and **Provident Life and Accident Insurance Co.** are all wrestling with gaps in the supply of tools for distributed systems management and doing a lot of patchworking. *Page 71*

Is it any wonder that stress is up across the board in IS departments? *Page 97*

But now for some good news.... The next time you turn over your PC population, installing add-on devices may be a lot easier. **Microsoft** is spearheading a coalition of hardware and software vendors behind a standard that would allow computers to automatically resolve conflicts among various cards and devices. Won't happen for at least a computer generation, however. *Page 2*

When you *do* go shopping for that next PC, here's an important fact to keep in mind: Not all 486 PCs are created equal. A recent study of machines from eight leading 486 PC vendors found major differences in reliability. *Page 41*

Borland tips groupware hand

By Michael Vizard
NEW YORK

Borland International, Inc. will unveil this week the second element of its groupware strategy with the launch of a version of Paradox for Windows that will incorporate its Object Exchange (Obex) technology.

Borland will also introduce updates for Paradox for DOS and Windows, as well as a separate edition of Paradox targeted at developers of client/server applications, according to the company.

Obex, introduced in Borland's Quattro Pro spreadsheet late last month, is a layer of software that encapsulates data into objects that can be transferred over either network or electronic-mail protocols. Both WordPerfect Corp. and Novell, Inc. are expected to announce support for Obex running on top of WordPerfect Office and the Novell Message Handling Service.

As part of an overall plan that calls for the stratification of Paradox into multiple editions for different types of sites, only the workgroup edition and the developer's edition will support Obex. These two are also the only versions to support SQL links to Borland's InterBase database and Microsoft Corp.'s SQL Server, as well as databases from Oracle Corp. and Sybase, Inc. They will also support a network configuration utility that simplifies the distribution of multiple copies of Borland software.

The delivery of Obex within Paradox gives Borland a database component for its pending groupware battle with Lotus Development Corp.'s Notes package, which is built on top of an object file system created by Iris Associates in Westford, Mass.

Borland maintains that instead of requiring information systems shops to adopt a separate set of middleware services such as Notes, developers should be able to create groupware applications using relational databases and existing shrink-wrapped software.

In Borland's view, Obex will allow a user to make data available by publishing it on the network or E-mail system. Other users could then subscribe to that data.

Because Obex currently supports only unidirectional transmission of data that must be accepted by the intended user, Borland said it is likely to be favored by database administrators seeking to screen updates to SQL databases from end users.

However, Vince Casarez, product manager for Paradox, said Borland is working on support for bidirectional, synchronized transmissions — a feature in Notes that enables it to lend itself more to interactive electronic discussions.

SQL databases are not well-suited for groupware applications because they require documents to be layered on top of the row and column model created for SQL databases, according to John Landry, Lotus' chief technology officer. Notes, in contrast, is based on an object model that can be easily deployed on a range of devices, from wireless handheld boxes to supercomputers, he noted.

Casarez countered that Paradox can support the storing directly in its kernel of binary large objects as large as 256M bytes per document. He added that Notes currently provides no means for updating SQL databases and that applications such as Quattro Pro can run on wireless devices.

Scorecard

The workgroup edition of Paradox costs $495. Paradox 4.5 for Windows, which adds support for dBase file formats and a faster implementation of Borland's ObjectPAL language, is priced at $149.95. Paradox 4.5 for DOS is also priced at $149.95. The developer's edition, which provides source code and debuggers, is priced at $695. Competitive upgrades to the workgroup edition are priced at $149.95, while upgrades from Paradox for Windows or DOS are priced at $129.95.

Plug and Play seeks to curtail PC hardware upgrade headaches

By James Daly and Ed Scannell

For anyone installing PC add-on devices these days, it is usually a "plug-and-pray" proposition. Microsoft Corp. wants to take the religious fervor out of the PC configuration change equation.

So last week the Redmond, Wash., firm marshalled a broad-based group of both hardware and software companies to solve the age-old struggle of most PC users to get all those plug-in circuit cards to work together.

The plan, called Plug and Play, would have the computer — not the user — sort out the numerous electronic conflicts that typically arise among the myriad memory cards, disk drive controllers and other devices used to upgrade systems.

"It is absolutely critical that we have internal infrastructure designs that understand each other," said Gerald Holzhammer, manager of desktop architecture and technology at Intel Corp.

Although Apple Computer, Inc.'s Macintosh line has had a self-configuring feature for five years, the XT/AT bus on IBM-compatible PCs lacks any mechanism for configuration management.

Each add-in card is given an electronic address that the PC uses when communicating with the board. If add-in boards share an address, the computer will not work properly.

Jump start

Configuration of Industry Standard Architecture (ISA) cards is typically done by technically savvy users through "jumpers," which give each card a unique electronic address. Users are also usually required to edit system software configuration files.

"It's like saying you have to open the TV set to plug in the VCR, and then when you do it, the thing still doesn't work properly," said Brian Belmont, manager of PC software development at Compaq Computer Corp.

Plug and Play would require manufacturers to redesign their plug-in cards by adding about 25 cents' worth of computer chips, said Moshe Lichtman, manager of Windows hardware platforms at Microsoft.

The chips would then automatically identify the card when the computer system is started. Either the computer's operating system or a separate utility program would collect information on all available cards and assign each an address, Lichtman added.

Limited use for PCs

Plug and Play design will be available in all future versions of Windows, and NT "would certainly adopt it," Liebtman said, adding that he expects the design to reach widespread acceptance by the end of 1994.

The Plug and Play scheme, however, will be of limited use to owners of most current IBM-compatible PCs because the feature cannot be added to existing cards.

Microsoft gave a brief demonstration of the capabilities of Plug and Play using an Alpha version of Windows 4.0, code-named Chicago, running on a system with an XT/AT bus. Windows 4.0 is expected next year.

Company officials declined to talk about how they would integrate technical aspects of the Plug and Play architecture into Chicago or NT.

Although the Plug and Play design has drawn approval from such heavy hitters as Intel, IBM, National Semiconductor Corp., 3Com Corp. and Compaq, it still lacks support from one key player, Novell, Inc., which did not have a representative at last week's briefing. "I have not been able to find anyone here who's even heard of Plug and Play," a Novell spokesman said.

OS/2 version

While IBM's Personal Systems unit also did not have a representative at the briefing, Bill Hoke, PC director at IBM's Technology Center in Boca Raton, Fla., said Personal Systems plans to include various Plug and Play capabilities in a future version of OS/2.

Microsoft and Intel released Version 1.0 of the Plug and Play ISA specification early this year, and two Plug and Play ISA cards are already available: a Small Computer Systems Interface card from Future Domain Corp. and an audio card from Intel.

Belmont said Compaq will have a Plug and Play BIOS on its machines within six months. Acer America Corp. also expects to get a machine with the Plug and Play BIOS by early next year.

In addition, Intel has released a development kit that allows users to use Plug and Play ISA cards with Windows 3.1. The kit contains a configuration utility that becomes an integral part of the boot-up process, acting as a virtual device driver with Windows.

At a glance

Operating system: IBM, Microsoft.

Networks: 3Com Corp.

Systems hardware: Compaq Computer Corp., AST Research, Inc., IBM.

Chips: Intel Corp., National Semiconductor Corp.

BIOS: Phoenix Technologies Ltd., SystemSoft Corp.

Best interests

Despite the various cooperative efforts among several hardware systems competitors to define the Plug and Play spec, its emergence should do little to diminish their tooth and nail competition. However, many hardware makers said they believe Plug and Play is a practical approach to jointly reducing support costs and growing sales.

"It is in our collective best interest to make some of these essential improvements to the PC architecture," said Carl Stork, Microsoft's director of Windows platform definition.

To many vendors, the Plug and Play design makes sense — and cents. A PC configuration change not only may be aggravating for users but also costs vendors money in support costs and discourages computer users from upgrading their components.

"The technical support calls come in droves with each new system update, so we're hoping that Plug and Play might be able to cut our tech support costs," said John Chang, director of product marketing at Acer America in San Jose, Calif. Greg Young, a product line manager at AST Research, Inc., estimated that 30% to 50% of AST's support calls are installation- or configuration-related.

— James Daly and Ed Scannell



Why take a chance?

Especially when there's a proven, industrial-strength software solution that can solve all your problems.

Introducing CA-UNICENTER®. The industry's leading systems software from the world's leading systems software company. It gives you absolute control over absolutely everything: security, storage and backups, production, performance monitoring, charge back, you name it.

Free

For Information On Free Seminars And Demo Disks Call 1-800 CALL CAI Ext. 145.

See how easy it is to take all the risk out of systems management. Call today.

Better yet, call right now.

COMPUTER ASSOCIATES
Software superior by design.

PLAY IT SAFE WITH CA-UNICENTER®

UNIX NETWARE OS/2 MVS VSE NT VMS

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies

Sun to take clustered server tack

By Jean S. Bozman
MOUNTAIN VIEW, CALIF.

Sun Microsystems, Inc. will try to retake the technological high ground at next week's Unix Expo in New York, where it is expected to unveil a clustered network file server.

Clustering is a way of boosting the throughput of Sun's current crop of Scalable Processor Architecture (SPARC) systems, which have been underpowered for some commercial applications, industry analysts said [CW, Aug. 23]. The new SPARCcluster1 network file server hosts two or four Sun SPARCserver 10 four-CPU machines. It is slated to ship by year's end.

Growing networks are pushing the limits of older Sun servers for memory, disk storage and backup. "I have a serious file server problem with about 120G bytes of disk on 10 [Sun] servers," said Peter Bishop, manager of computing resources at Cirrus Logic, Inc. in Fremont, Calif. Bishop has been beta-testing SPARCcluster1 for several months. "This will allow me to put more disk in one place than I'm able to do today."

Bishop plans to install SPARCcluster1s this fall to support 400 Sun workstation users at his firm, which makes computer circuits for laptop computers and peripheral controllers.

In the next three years, all major Sun servers will be available as clustered systems, including the eight-processor SPARCserver 1000 and 20-processor SPARCcenter 2000, Sun said.

The first generation of Sun clusters will be configured as network file servers only, said Stephen Zocchi, manager of server product marketing at Sun. A second generation will debut next year and run distributed databases, including Oracle Corp.'s Oracle 7 Parallel Server. A third generation of clusters, with support for high-speed fiber optic and Asynchronous Transfer Mode networks, is due in 1995, Zocchi said.

At first, the servers in the Sun cluster will be connected by a front-end Ethernet switch called the Sun ONT (for Optimum Network Throughput), which will allow workstations to view them as a single network resource. The second generation of clusters will also have a back-end distributed lock manager to connect the onboard servers to shared disk drives.

Clusters may also improve reliability in Sun networks, allowing them to keep running even if one server in the cluster fails, some users noted.

"With a cluster, you will be independent of problems with the power supply or the memory going bad because there's no single point of failure," said James Stikeleather, director of systems development at Kash n' Karry Food Stores, Inc., a $1.2 billion grocery chain in Tampa, Fla., that has 30 Sun servers. Database clusters will make individual servers "transparent" to end users because of mirrored database updates between servers, he said.

Centralized management of distributed software will be key to Unix servers hosting applications taken off aging mainframes, analysts said. To meet this need, Sun will bundle the SPARCcluster1 with system management software. It will also support Computer Associates International, Inc.'s CA-UniCenter and Tivoli Systems, Inc.'s TME.

Industry analysts said Sun servers often provide better price/performance than many Unix rivals but not always the highest raw speed. Future Sun systems will run the 64-bit UltraSPARC chip being developed by Sun and Texas Instruments, Inc. for 1995. Until then, clusters of 32-bit SuperSPARC processors will be harnessed together, supporting up to 500 Sun desktop clients.

Clusterized

Sun plans to pit its new SPARCcluster server against HP's 9000/H60

SPARCcluster1*	HP 9000/H60
• 2 SPARCserver 10 Model 40s	• 96-MHz PA-7100 RISC chip
• 512M bytes of main memory	• Uniprocessor
• Up to 100G bytes of storage	• Up to 64M bytes of memory
• Up to 20 Ethernet LANs	• Up to 10 byte of storage
• Supports NFS file server software	• Up to 12 Ethernet LANs
• Price: $85,000	• Price: $83,000

*Quad processor version also available

Midrange systems

AS/400 infused with client/server features

By Craig Stedman
NEW YORK

IBM continued last week to press the client/server button on the Application System/400, introducing three models specifically configured as servers and laying out plans for other products aimed at erasing the midrange line's lingering host-centric stigma.

Many of the products will not be available until next year, including new database functionality, a faster Transmission Control Protocol/Internet Protocol implementation and an optional 486-based I/O processor that is supposed to speed the AS/400's file-serving performance.

Time enough

However, analysts and users said next year should be soon enough to get the AS/400 into the client/server game.

"You're talking eight to nine months from now, and we'll be lucky if we can even understand [client/server] and put a blueprint together for implementing it in that kind of time frame," said Scott Plumer, technical support project manager at Gannett Co.'s data center in Silver Spring, Md.

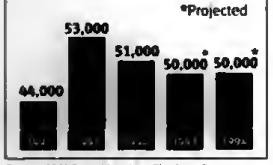
"IBM has plenty of time to get into the market," said David Andrews, managing partner at ADM Consulting, Inc. in Cheshire, Conn. However, he said he is not sure IBM is up to the task of reinventing the AS/400's image. The system has been marketed "very conservatively," leaving it mostly unknown outside the installed base, he said.

Susan Whitney, midrange systems director for IBM U.S., acknowledged that the AS/400 is still perceived as less attuned to open client/server computing than Unix machines. "We need the opportunity to sit down [with customers] and describe what we have to offer because we don't have the allure of Unix," she said.

Holding pattern

AS/400 shipments are expected to remain flat through next year while IBM improves the system's client/server support

AS/400 unit shipments



Source: ADM Consulting, Inc., Cheshire, Conn.

As expected, the three AS/400 Server Series models use higher-end central processors unlike regular AS/400s they correspond to in pricing [CW, June 28]. That enables the new machines to run CPU-intensive server applications three to five times faster, according to IBM.

The servers, along with the other products IBM detailed (see story at right), drew praise from some users. "This is almost like a coming-out party for the AS/400," Plumer said.

Plumer added that the 486-based I/O processor due out next year could let Gannett move its file-serving operations off PC local-area network servers running Novell, Inc.'s NetWare.

Needed stability

Patriek Stramecky, information services director at Garb-Ko, Inc., a convenience store franchiser in Saginaw, Mich., is also interested in using the AS/400 as a server. "To bring to the table the stability that's usually associated with the 400 would be a real blessing," he said.

However, Stramecky said he is not convinced IBM's Application Business Systems unit has "gotten out of the old proprietary mode." Garb-Ko, which is just upgrading from a System/38 to the AS/400, would have looked at alternatives if not for internal issues that made a change unwieldy, he said.

Jim Matsey, corporate director of information systems at Reynolds Metals Co. in Richmond, Va., said he does not expect to "look real seriously" at the AS/400 as a client/server platform until machines based on the PowerPC architecture are available in 1995.

The servers introduced last week are an interim step while IBM develops the PowerPC hardware, which should have built-in server capabilities on all models, Andrews said.

And now, introducing...

IBM's AS/400 product introduction last week included the following:

- AS/400 Server Series Models 100, 135 and 140, priced similar to the existing F02, F10 and F20 systems but with three to five times the processor performance in server applications. Hardware prices range from $15,500 to $57,000. The 100 and 135 will be available in December, the 140 next March.
- File Server I/O Processor, an optional 486-based unit due to ship in 1994. Exact schedule and pricing was not disclosed. Will support OS/2 LAN Manager initially; future NetWare support not ruled out.
- Packaged LAN-enabled Server Series configurations, bundled with 1994 ValuePoint PCs for OS/2 or Windows and a new LocalTalk adapter for Macintosh.
- Software for transparent access between AS/400 and NetWare servers, plus increased interoperability with Unix workstations. IBM is also now reselling Apple Computer, Inc.'s Data Access Language server software for accessing AS/400 data from Macintosh systems.
- OS/400 operating system being rewritten to increase file server performance threefold. Available by end of 1994.
- Integrated OS/400 database to get support for various new functions, including triggers and stored procedures, Open Database Connectivity and OS/2 Integrated Database Application Programming Interface support also planned. Available late 1994.
- Transmission Control Protocol/Internet Protocol being rewritten for eightfold improvement. Advanced Program-to-Program Communications for threefold gain. Both due in 1994.
- Graphical user interface for printing AS/400 files and sending or displaying messages from Windows and OS/2 PCs. Available in 1994.
- Expanded memory capacities; higher-performance 9337 storage subsystems with new controller and write cache capabilities; 3494 tape library supporting 640 half-inch cartridges; four new midrange printers.

—Craig Stedman



8 of the top 10 'For ... panies are using Oracle7.

Here's what our customers are saying about Oracle7:

"It's the driving force behind our most sophisticated applications."
"You can't break it, it just keeps running and running."
"It's the best Client/Server solution out there."
"We needed a truly open solution: Oracle7 is it."

To find out more about why companies of all sizes are choosing Oracle7, call us. We'll send you in-depth analysis from IDC and Aberdeen, and you'll see for yourself why everyone is so excited. 1-800-633-1071 Ext.8120

ORACLE

©1993 Oracle Corporation. Fortune is a trademark of Time Inc.

Charles Babcock

Hybrids step up to object handling



In this space last week, I said no commercial SQL databases implement full-bore object handling, but I hasten to add that there are several interesting hybrid systems that both store objects and use SQL.

To be sure, these systems incorporate many proprietary extensions to SQL or an extended pattern of table organization. But those variations merely make them more interesting. By taking a different approach, they have forged ahead of the RDBMS vendors and are getting a hearing before the ANSI X3H2 committee. That panel still faces the large task of getting SQL to deal with objects. Its solution may resemble one of these systems with both relational and object-oriented properties.

UniSQL/X is a hybrid best characterized as a relational database extended to achieve object handling capabilities. It is the product of UniSQL, Inc., an Austin, Texas, company founded in 1990 by Won Kim, a former database theorist at IBM's Almaden, Calif., facility. Kim also worked with the Microelectronics Computer Corp.

UniSQL was one of the systems that the Petrotechnical Open Software Corp. adopted a year ago for accessing many different types of data. Locating and using dissimilar data has been the bane of the oil industry as its engineers try to search volumes of scattered seismic findings.

Kim stuck with the basic principle of relational database, organizing information in rows and columns of tables. But in UniSQL/X, a column of a table can have another table as a data type. Different types of data can then be related to one another in a nested sequence of tables, creating a vessel in which to store a complex object. UniSQL nests the tables by using pointers from table to table, which aids retrieval performance. This implementation also requires a modification to standard SQL — the addition of a path expression to the query, which names the targeted nested column.

The nested relationship lets UniSQL enforce integrity for domains — a set of related data with certain rules attached to it. With domain support, the name of your Federal Express driver might be added to a database of outside service people but could not be mistakenly added as a company employee. The employee domain would have a rule that required a department entry for each employee, and "Fedex" is not a department at most companies.

Kim also implemented enforcement of inheritance for tables created as "children" of parent tables, adding another object-oriented feature. UniSQL also creates unique identifiers for objects.

A second example, HP's OpenODB, is a hybrid of the opposite sort — an object-oriented system that front-ends an underlying relational database. HP has licensed OpenODB to Informix, which is expected to announce it as an object-oriented addition sometime next year.

OpenODB's SQL is standard SQL with many extensions for dealing with objects. Like UniSQL, OpenODB also creates a unique identifier for each object, and its approach for doing so has been adopted by the X3H2 committee working on SQL III. OpenODB's SQL has defined ways of grouping data in sets, lists or bags in an object-oriented style, with associated rules.

HP's product is capable of dealing with relational, object-oriented or legacy data in the same system, and for that reason it too has been tested and used by the Petrotechnical Open Software Corp.

For example, Michael Stonebreaker, founder of Ingres, continues his pioneering work with Postgres, another hybrid system. Other efforts are also under way.

These early approaches may never catch up with the relational vendors in terms of recovery, performance or tools, but at the moment they represent the best thinking on how to manipulate objects and large volumes of simple relational data.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

Women cheer salary gap news

Acceptance, experience, promotions all closing gap

By Mitch Betts

"Hallelujah!" was how one woman in information systems management responded to the news that the earnings gap between men and women in the IS field is narrowing, albeit slowly and unevenly.

Computerworld's recent survey of 1,239 IS professionals showed that, on average, women earn 15% less than men. That disparity exists even within the same job titles [CW, Sept. 6]. However, that figure was an improvement over the 21% "gender gap" uncovered by a similar 1992 survey.

Why is the gap closing? "Acceptance, knowledge and experience, plus a little affirmative action to equalize pay," said Rose Gladstone, manager of business systems at Hoechst Celanese Corp. in Wichita, Kan.

"My impression is that the situation [for women in IS] is improving," said Elaine R. Bond, senior technology consultant at The Chase Manhattan Bank NA. "The longer women are in professional and managerial positions, over time that [salary] gap is going to close," she said.



Bob Wilcox

Laraine Rodgers: *Senior execs not ready for women CIOs*

Indeed, the main reason the pay gap is narrowing is simply because women have worked in the IS field long enough to move into higher-paying management ranks, according to Magid Igbaria, professor of MIS at Drexel University in Philadelphia.

"Women in IS are closing the gap in education, training and experience... and that translates into better pay," said Igbaria, who studies IS career issues.

Not in high places

In *Computerworld*'s salary survey, the gender gap for chief information officers was especially small (6%), but there are still very few women in the top echelon. *Computerworld*'s 1992 study of the demographics of the IS profession showed that only seven out of 100 CIOs are women [CW, Feb. 1].

The reason for the "glass ceiling" that keeps women statistically bunched in the midlevel jobs is that "many senior executives are just not ready for a woman in that [CIO] role," said Laraine Rodgers, MIS director for the city of Phoenix.

The good news is that executive recruiters are now targeting women to fill senior IS positions, Rodgers and Bond said. The bad news is that women will be paid less than the men they replace.

For example, Rodgers said a woman now paid $90,000 a year will be recruited to replace a man making $300,000, but the woman will be offered only $200,000.

One female MIS director, who requested anonymity, said her pay is on par with men carrying the title of director, but the scope of her responsibilities and budget should place her at the higher-paying vice president level. The disparity is partly "gender-related," she said, and partly the result of the company's underappreciation of the importance and complexity of IS.

Glacial progress

Women in IS management are slowly closing the earnings gap with their male counterparts

	1992 Gender Gap*	1993 Gender Gap
CIO/VICE PRESIDENT	21%	6%
IS DIRECTOR/MANAGER	18%	15%
AVERAGE OF ALL IS JOBS	21%	15%

*Percentage that women's pay is less than men's

Source: *Computerworld* salary surveys

The salary survey, as well as interviews with women with varying experiences, showed that it is hard to generalize about the gender gap. The pay disparity increased from 6% to 11% for the job title of systems manager, for instance, but women holding the title PC manager actually make 6% more than men with that title.

Cinda A. Hallman, CIO at Du Pont Co. in Wilmington, Del., praised the knowledge-oriented IS profession as "good for women. It's relatively new compared with engineering and finance and lacks some of the traditional biases," she said.

She said that in her own IS organization, with 5,000 employees worldwide, there is absolutely no pay disparity for men and women in the same jobs.

Several female CIOs emphasized that their rise to the top required long hours and frequent moves to jump at new opportunities. Hallman, for example, said she has relocated seven times and spent eight years in foreign countries in her career.



Elaine Bond: *'Over time that [salary] gap is going to close'*

Marina Mann, vice president of information technology at Electric Power Research Institute in Palo Alto, Calif., said she has noticed a cultural shift. "We spent years just getting men comfortable having us in the same room, and then we didn't get the rewards for our contributions. Now, we're becoming equal business partners," she said.

Takes time

Cracks are appearing in the glass ceiling across the board in corporate America. Women in executive ranks have seen their salaries double in the past 10 years to an average of $187,000, according to a study of 400 female executives (vice president level and above) conducted by Korn/Ferry International and the University of California at Los Angeles.

But closing the gender gap completely will take at least a generation, and perhaps even longer than that, Bond said.

"I'm not sure the younger generation is a whole lot different, which reinforces the fact that this is a cultural issue. That doesn't change dramatically in a short amount of time," she said.

IBM strategy looks to custom apps

By Michael Vizard
CHICAGO

IBM is building a PC software business model based on object-oriented technology that it hopes will eventually enable it to become a supplier of custom PC applications for specific environments.

In theory, the IBM strategy is based on the assumption that information systems shops will outsource development of desktop applications to companies such as IBM, which can complete the project at a much cheaper cost by leveraging work already done for other companies.

The strategy behind IBM's planned return to desktop application development is based on the expectation that object technology, derived mainly from its Taligent project with Apple Computer, Inc., will drastically cut application development time, according to James Cannavino, IBM senior vice president for Personal Systems. Once this occurs, IBM will be able to cost-effectively deliver made-to-order applications for individual sites.



James Cannavino: *Sees IBM as player again*

Cannavino revealed IBM's plans while speaking at the Corporate Compnter Professional Exposition held here last week, sponsored hy the Corporate Association of Microcomputer Professionals.

"I believe that what happened in the hardware business in terms of reducing cycle times will eventually happen in the software business," Cannavino said. He was referring to the fact that users today can custom-design their PC orders. IBM wants to apply thal model to software.

Back in the game

This market is drastically different from the current set of monolithic applications, such as Lotus Development Corp.'s 1-2-3 spreadsheet and WordPerfect Corp.'s WordPerfect word processing package, that dominate the PC industry. Unable to effectively compete in the shrink-wrapped PC software market, IBM withdrew from this arena in the late 1980s.

Last week, however, Cannavino characterized that move as a mistake that has resulted in IBM missing out on the development of important PC technology. But as the current shrink-wrapped market moves toward a more object-oriented model, Cannavino said he envisions IBM becoming a player once more.

However, before IBM is ready to supply custom applications on a large scale — probably not until mid-decade — it has to put in place an object-oriented infrastructure.

Thus far, IBM has delivered the initial components of a distributed system object model that allows applications to share objects, but the company still must deliver an object-oriented development environment that will make it easy for developers to find the objects they need to build a particular application.

In general, users said they are encouraged by IBM's intentions and that they believe IBM will deliver a more open environment than its rival Microsoft Corp., which is building an object-oriented environment called Cairo.

For example, John Dohm, a member of the OS/2 user group here who is moving from a ntilities firm to a management consulting firm, cited Microsoft's decision to offer Visual Basic only with Microsoft applications as a sign that the company is pursuing a closed environment designed to force users to buy Microsoft applications.

Dohm added that Microsoft's strategy is aimed at turning end nsers into developers by giving them Visual Basic, while IBM's strategy appeals more to corporate developers. He said the Microsoft strategy encourages the creation of "data empires" through an organization by allowing end users to create applications that are incompatible with one another, poorly designed and difficult to support.

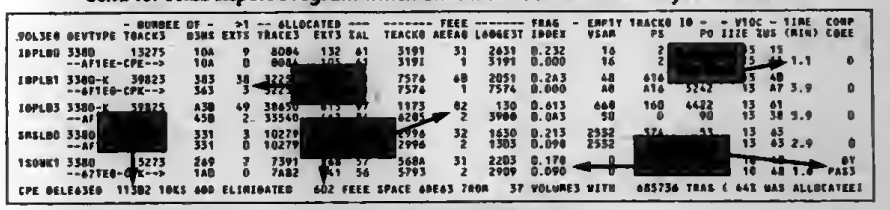


Consolidates Free Extents and Releases Unused Space 50 to 80% Faster than IBM's DFDSS DEFRAG...with the added value of:

- Releasing Space from VSAM and DB2 files
- Releasing All or a Percentage of Unused Space during COMPAKTion and Stand Alone
- FASTCPK offers CANCEL Protection and Full Recovery from Job or System crashes
- Positioning Data Sets by Last Reference Date or User Specified
- Expanding and Positioning the VTOC
- Combining Extents on VSAM, DB2, PS and PO Data Sets

— Compare for Yourself —

Send for FREE Report Program which Simulates COMPAKTion on your volumes



Call for a FREE No Obligation 90 Day Trial

INNOVATION® DATA PROCESSING

CORPORATE HEADQUARTERS: 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300

EUROPEAN OFFICES: FRANCE 01-47-69-15-15 | GERMANY 089-439-2053 | NETHERLANDS 036-534-1660 | UNITED KINGDOM 081-905-1266 | NORDIC COUNTRIES +31-36-534-1660

News Shorts

Novell files complaint against Microsoft

Claims of unfair competitive practices continue to hound **Microsoft Corp.**, as the company disclosed last week that **Novell, Inc.** has filed a complaint with the Commission of the European Communities Directorate-General for Competition. The Directorate-General is assessing the validity of the complaint, filed on June 30. In a statement, Microsoft's legal counsel said the firm intends to cooperate with the investigation, saying it believes the complaint has no merit.

Frederick Wang chosen for board seat

As **Wang Laboratories, Inc.** prepares to shed its Chapter 11 protection next week, Frederick Wang, the company's former president and chief operating officer, has been chosen by his family to fill the single seat given to the Wangs on the new board of directors being formed as part of the company's reorganization. Three Wang family members were directors prior to the Chapter 11 filing last year, and the family controlled 75% of the board seats altogether.

ASK, Oracle firm up data replication

The ASK Group, Inc.'s Ingres Products Division confirmed plans last week to ship a database replication product by the end of 1993 [CW, June 28]. The Ingres/Replicator is in beta testing at 10 sites and will be priced at 35% of the cost of an Ingres server. Separately, **Oracle Corp.** will demonstrate enhancements to its replication feature in two weeks at its annual user conference. However, Oracle declined to comment on pricing or availability of the planned feature.

World Trade Center looks into security

Following the February bombing of the World Trade Center, **The Port Authority of New York and New Jersey** is looking to information technology to provide tighter security for the complex. The agency last week sent out a request for prequalification information to vendors interested in developing an enhanced turnkey hardware and software security system.

Lotus bundles mail and scheduling

After deciding to pull CC:Mail from its discounted suite of Windows desktop applications, **Lotus Development Corp.** announced last week it will sell 10-user packages of CC:Mail for Windows bundled with the group version of Lotus Organizer, a personal information manager, for $845. Meanwhile, Lotus' recently announced suite of 32-bit applications for OS/2 desktops does include CC:Mail. That is because the OS/2 suite is more likely to be purchased by the information systems departments in charge of electronic-mail purchases, a Lotus spokesman said.

SHORT TAKES Roel Pieper, the former president of **Unix System Laboratories, Inc.**, has joined **Ungermann-Bass, Inc.** as president and chief executive officer. . . . Joseph J. Campbell has been promoted to senior vice president of IS and business processes at **Home Insurance Co.** in New York. He had been senior vice president of national mortgage processing. . . . **IBM PC Co.** last week dropped prices of its ImagePlus software for OS/2 by up to 75% and introduced enhancements including a better interface and support for more printers. . . . **Apple Computer, Inc.** announced last week it has begun shipping AppleSearch search and retrieval server software. AppleSearch lets users organize and retrieve unstructured information from complicated server databases. . . . **Digital Equipment Corp.** last week named Ronald Bohlin vice president of strategic services for its Digital Consulting organization.

More news shorts, *page 16*

CASE vendor looks ahead

KnowledgeWare taps R&O repository in client/server push

By Melinda-Carol Ballou
ATLANTA

KnowledgeWare, Inc. will push forward into the client/server arena next month when the company announces a technology alliance with repository vendor R&O, Inc., multiplatform support for Application Development Workbench (ADW) I-CASE tools and better integration between ADW and KnowledgeWare's client/server tools, according to internal company sources.

A recent reorganization in which KnowledgeWare cut its mainframe development staff also allowed the firm to unify its integrated computer-aided software engineering (I-CASE) and client/server tools strategy, analysts said. Those vendors that do not push into the client/server world with traditional CASE tools in the next 10 months "will be locked out of the market," according to Jim Sinur, a director at Gartner Group, Inc. He said this announcement may mean the survival of ADW as a CASE tool for the '90s.

"Traditionally, KnowledgeWare has struggled with providing a data ecocyclopedia/repository." He added that if true, "the announcement with R&O will give them a leg up since this is the most advanced repository we've seen to date."

R&O's Rochade repository supports a range of operating systems, including MVS, VM, VMS, Unix, MS-DOS, OS/2 and Windows, with plans next year for Microsoft Corp. Windows NT support. The product also supports data interchanges with a range of CASE tools (see chart).

KnowledgeWare will also release a unidirectional bridge between ADW and ObjectView by year's end, with a bidirectional bridge slated for shipment during the first half of next year.

KnowledgeWare will distribute Rochade as its repository across the enterprise to complement KnowledgeWare's data encyclopedias, according to sources at KnowledgeWare.

The ADW interface for Rochade will enable ADW developers to choose which operating system they want to target for the repository and to run either their clients or servers in that environment, sources said.

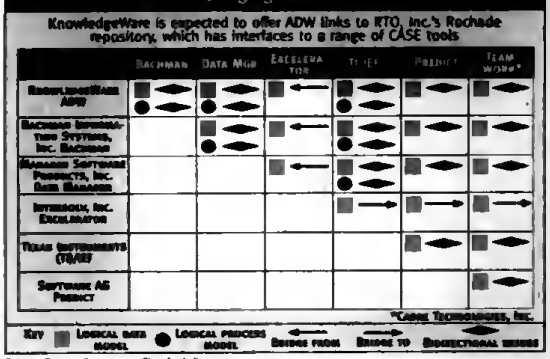
ADW users were enthusiastic about the prospect of repository support for their ADW applications, though somewhat cautious about committing to the strategy before they had fully evaluated it.

"The biggest thing for us is moving the data closer to our customers — letting them access it from within their environments," said Tim Casper, a system architect at Kerr-McGee Corp., an energy and mined chemical firm in Oklahoma City.

In addition to support for R&O's repository, KnowledgeWare will be announcing the long-awaited release of Unix versions of ADW, as well as Windows and NT support for ADW, with shipments likely next year. Initially, users will be able to execute ADW applications on the different platforms, with full development support coming on Unix this year and on the other platforms next year.

Bridging vendors

KnowledgeWare is expected to offer ADW links to RTO, Inc.'s Rochade repository, which has interfaces to a range of CASE tools



Source: Gartner Group, Inc., Stamford, Conn.

Alabama auditors take stock with pen computing for inventory management

By Michael Fitzgerald
MONTGOMERY, ALA.

Like the peasant in Monty Python's *Search for the Holy Grail*, pen computing will next week emit a bleating "I'm not dead yet," when the Alabama State Auditor's Department announces it will buy as much as $500,000 worth of pen computers.

The purchase may signify an easing in the supply problems that have plagued pen-based hardware makers, a factor that has limited access to pen systems.

For the Alabama state auditor, which tracks some 315,000 items — from the talking mechanical owls that greet tourists at Alabama's rest areas to airplanes — the pen systems are expected to help complete the state's annual inventory surveys in the required year time frame.

Pen based SYSTEMS

Don Kelly, the assistant state auditor for the state of Alabama, said pen-based pilots showed a 60% reduction in the time needed to conduct an inventory of equipment, which should let the auditor's department complete the audit annually.

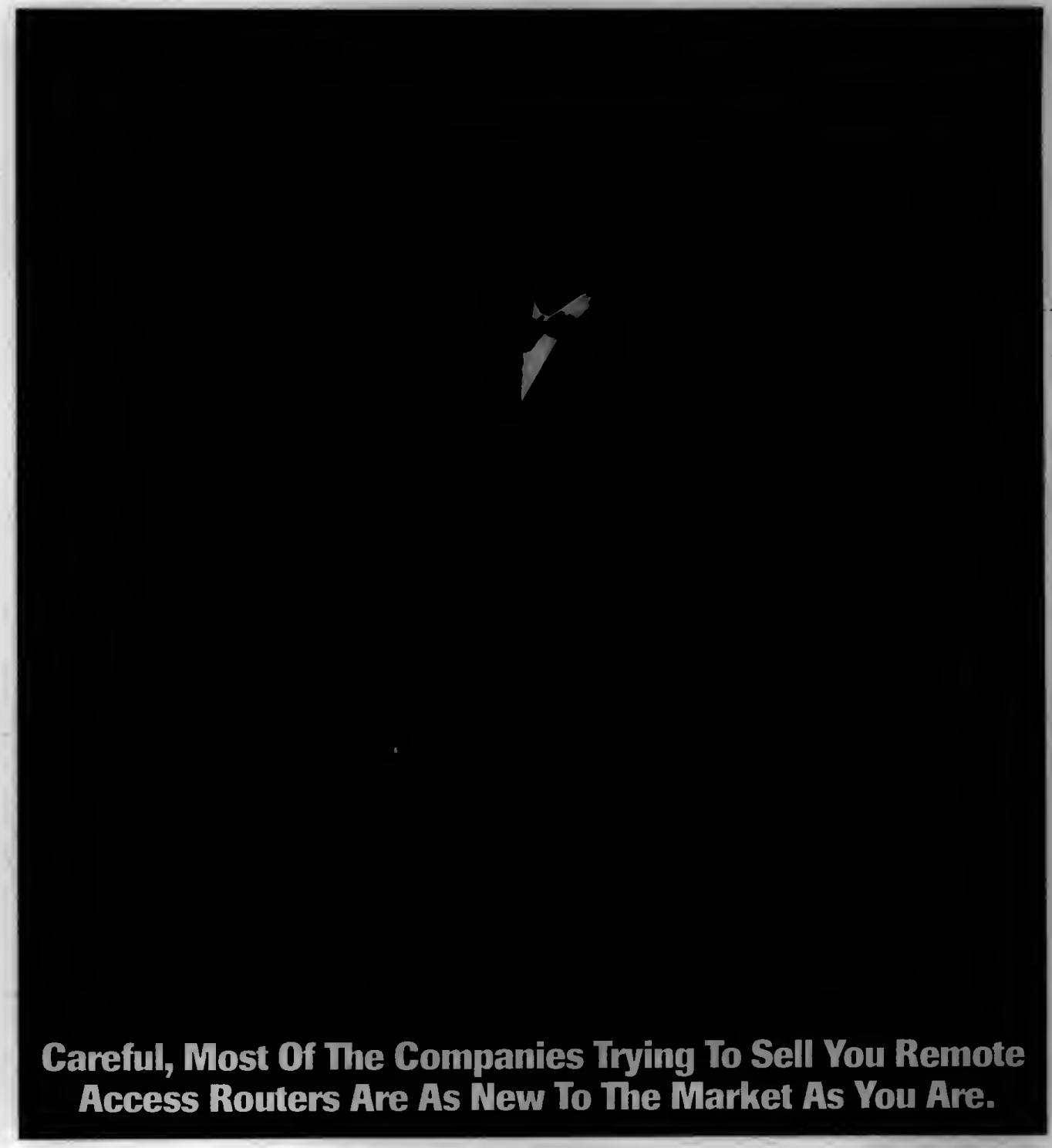
Kelly also said the systems should help the department and the state save money through reduced personnel use and better inventory controls.

The system transparently tracks when every transaction occurs. Because of this, the state expects to track its $500 million in inventory more effectively, which may lead to significant savings from not having to replace lost items.

The new auditing system is based on bar-coding. Auditors have so far installed bar codes on the property used by 40 of the state's 139 agencies. The bar code is scanned by one end of the pen, while the other end acts as a stylus, so a property officer can scan and write at the same time.

The state wrote its data-tracking application in Pen Pal Associates' Power Pen Pal 4.0, said Pete McCoy, technical specialist for the state. The state is buying Fujitsu Personal Systems, Inc.'s 325Point, a tablet-size system with a 386SX-class chip in it.

The state plans to roll out between 100 and 200 systems to its 200 property officers by the end of the first quarter of 1994.



Careful, Most Of The Companies Trying To Sell You Remote Access Routers Are As New To The Market As You Are.

Experience has taught us that a low price tag doesn't mean much if it comes at the expense of functionality and scalability. That's why Cisco guarantees access without compromise. Cisco's family of remote access products is designed to grow with your network and can be upgraded at any time. So we can meet your present and future needs. Just as importantly, Cisco lowers your total cost of ownership, with exclusive features like AutoInstall, for plug-and-play access. Dial-on-Demand routing. And CiscoWorks,™ which allows centralized router management of all your remote sites, even if you have thousands of them. Find out why Cisco continues to be the leader in the router market. Call us at 1-800-859-2726 for a flexible, scalable internetworking solution. After all, there's no substitute for experience. **Access Without Compromise.™**

CISCO SYSTEMS

©1993 Cisco Systems, Inc. All rights reserved.

Banyan to simplify storage management

By Elisabeth Horwitt
WESTBORO, MASS.

Banyan Systems, Inc. last week promised by mid-1994 to provide administrators of distributed, multivendor client/server installations with the ability to manage storage devices with the same ease and degree of centralization they have long enjoyed on mainframes.

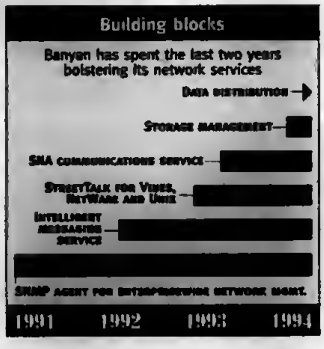
Banyan's storage management offerings, which constitute the next phase of its platform-independent network services architecture, cannot come too soon for large Banyan shops such as Pacific Gas & Electric Co. (PG&E).

"We've learned a lot of [useful] things in the mainframe world that we haven't yet taken down to the client/server world," with storage management being one of the keys, said Arthur Beckman, manager of client support services at the San Francisco utility. He has some 460 Banyan Vines servers in-house, many holding critical information and some holding 1G byte of data or more. As such, "the old method of equipping each server with a 100M-byte tape drive doesn't work anymore."

Banyan plans to address the needs of customers such as PG&E with a three-part rollout of storage management products that it will codevelop with Legato Systems, Inc., according to David Penzias, director of business development. Banyan recently bought a $500,000 stake in the storage management company.

The rollout phases are as follows:

- **Phase 1:** Enterprise Backup and Restore will deliver "mainframelike" centralized backup and restoration services in a heterogeneous client/server environment. Network administrators will be able to set up automated backup of client files to disk, as well as institute policies and procedures for backing up and restoring files throughout the company, Penzias said. The first deliverables are slated for mid-1994.



- **Phase 2:** Hierarchical storage management, a series of applications for automatically moving files from high-speed, high-end direct-access storage devices to lower-speed, lower-cost devices such as tape drives. This addresses users' need to clear their primary storage devices of files they may "only access once a year" but do not want to delete entirely, Beckman said. No time frame was given.
- **Phase 3:** Data Distribution Service, which will coordinate the movement and replication of files, directories, software packages and updates to disks located on different servers and clients throughout a company.

Potential applications include companywide software updates and the need to move daily records of transactions at individual outlets from local disks to a central repository, said Drew Wolff, Banyan senior product manager.

"Right now, users do this via 'Sneakernet' or large E-mail notes or by mailing disks back and forth or copying across PC subdirectories — none of which is particularly efficient," he said.

Banyan gave no time frame for the data distribution service.

The above offerings will be integrated with existing Banyan network services and will run across the client/server environments now supported by Banyan enterprise services: Novell, Inc.'s NetWare and Unix. They will also support the full range of clients, including DOS, Unix, Windows, Macintosh and OS/2, Banyan said.

To change the way you do business, you need two things. Brains. And guts.



O.K., so you've got what it takes. Now what?

You need a partner. One who knows work management. Thinks office productivity. Does office software. And is driven like yourself.



A partner like Wang. We know business process management, imaging, document management, and workflow. We created the best imaging software products you can buy. Totally open. Using the most advanced technology—and for far less than you think.

Our OPEN/image products are built with the best from the best: UNIX. Windows. NetWare. From IBM, HP, Microsoft, and Novell.

Wang gives you the power to image-enable any environment; to connect imaging to your applications. That's why we have more imaging solutions installed than anybody.

Wang has always been—and still is—the leader in developing imaging solutions on multiple platforms. Does that make our customers happy? Just read the latest *Computerworld* Buyers' Scorecard on imaging. There are good reasons why we're #1. (If you don't have a copy, we'll send you one.)

So if you're ready to change the way you do business, talk to somebody who knows a lot about change. Call Wang. 1-800-229-2973. You have what it takes. And so do we.

WANG

OFFICE PRODUCTIVITY SOFTWARE

© Copyright 1993 Wang Laboratories, Inc.

"When we rightsize with Micro Focus, we rightsize for any platform we choose."



Gail Stein, Product Manager, Dun & Bradstreet Software

Dun & Bradstreet Software has developed and supported advanced business software solutions for organizations worldwide for nearly thirty years.

With over 10,000 customers running applications on everything from mainframes to PCs, Gail Stein, a Product Manager with Dun & Bradstreet Software, needs to be sure of cross-platform portability.

"One of our corporate goals in migrating our products from the mainframe to open systems, was to have common source code across many platforms. Micro Focus allows us to create a common set of source code which enables our Millennium financial software to run on Data General®, Hewlett Packard® and ICL® hardware running the UNIX® operating system. Now when we rightsize applications, we rightsize them once and for all."

"We see the move of the Millennium products to mid-range platforms as a cost-effective answer for customers who are currently running our products on the mainframe, and need to cut costs. It also gives them the ability to move their software from one platform to another, essentially with a seamless transition, without disrupting the day-to-day work flow of their organization."

"Ensuring product performance and portability is an ongoing project for any software vendor. With Micro Focus solutions, we can run on any hardware we are targeting today, as well as any platform we might look at in the future."

When the world's leading corporations demand ***"A Better Way of Programming,"*** they turn to Micro Focus. For more information on putting Micro Focus Downsizing and Cross-Platform Solutions to work for you, call **800-872-6265**.

MICRO FOCUS®

Micro Focus Inc. 2465 East Bayshore Road, Palo Alto, CA 94303. Tel. (415) 856 4161

Micro Focus is a registered trademark and "A Better Way of Programming" is a trademark of Micro Focus, Inc. All other trademarks are property of their respective companies.

GSA Contract Number GS00K93AGS6403.

NetWare to manage remote users' access to corporate LANs

By Elisabeth Horwitt
PROVO, UTAH

Novell, Inc. last week announced a dial-in, dial-out NetWare Loadable Module (NLM) that it claimed will allow information systems managers to both satisfy and control the hordes of laptop-wielding users who want easy access to corporate LANs from the road and home.

This announcement does for NetWare what the AppleTalk Remote Access standard did for Macintosh users: It provides a standard for DOS machines remotely accessing NetWare local-area networks that third parties can build to, said Jay Batson, an analyst at Forrester Research, Inc. in Cambridge, Mass.

Users have been waiting for Novell to do this so the remote LAN access market can really take off, he added. "However, what users really want is for Novell and Apple to both support the Point-to-Point Protocol (PPP)," which would potentially allow them to combine dial-in facilities for Macintosh and DOS/NetWare LAN users, Batson said. Both vendors have promised PPP support at undisclosed dates.



Outer bounds

The total market for LAN remote access and remote control products as well as incremental modem installations to support them, will grow from $529 million this year to almost $2 billion in 1996, according to an April '93 report from Forrester Research, Inc. called "Sizing the LAN Outer Network Market."

Get the connection

Novell's take on this potentially lucrative market is NetWare Connect, an NLM that is said to be the first product to support both dial-in and dial-out connections. This allows network administrators to use the same modem pools and ports for both incoming and outgoing calls, offering big cost savings, said Gerry Machi, vice president and general manager at Novell's interoperability group.

In addition, users can configure a Novell electronic-mail server to dial out via the NetWare Connect server, eliminating the need for a separate set of modems for E-mail.

The product is also said to provide a range of security and auditing features that enable administrators to track attempts at unauthorized access from outside, as well as track inside users' dial-out calls for accounting purposes.

NetWare Connect will also provide the communications underpinnings for the upcoming Novell client software product, Personal NetWare, that will facilitate and manage laptop users' access to LAN resources, Machi said.

For example, Personal NetWare will be able to "virtualize" a laptop's connection to LAN resources so that the user can disconnect from the LAN, prepare jobs to go over E-mail or printer connection, and then reconnect and send those jobs to the LAN, Machi said. In addition, updates made to the user's PC on the LAN will automatically update the laptop's database. Novell has not yet formally announced Personal NetWare.

NetWare Connect is currently scalable from two to 64 ports and will support hundreds of ports in a few months, Machi said.

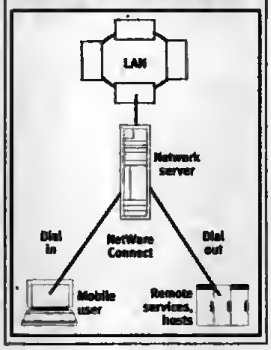
The NLM runs on NetWare v3.11 and 4.0. It supports remote control packages that enable a remote PC to dial into a local PC and operate it. NLM also runs with remote node packages that allow a remote PC to act as if it resides on the host LAN. It is manageable by Simple Network Management Protocol.

The product supports more than 100 third-party communications hardware and software products through its backward compatibility with NetWare Asynchronous Communications Services. Hardware support includes a range of network adapters supporting X.25, Integrated Services Digital Network and other wide-area network links.

Priced at $595 for a 2-port version and $5,995 for a 32-port version, the NLM is due to ship Oct. 8.

Two-way street

NetWare Connect provides both inbound and outbound connections for LAN and remote users

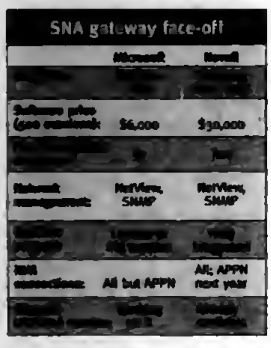


Novell vs. Microsoft

CONTINUED FROM COVER 1

Based on evaluations of both products, "NetWare for SAA and SNA Server are very, very close in terms of ease-of-use features and performance; both are very easy to configure and install," said Tony DeFeciani, manager of micro systems and communications at the New York State Assembly. As a result, the fact that "NetWare for SAA is much more expensive is important to us," he added.

Nevertheless, Microsoft may have trouble making inroads on NetWare for SAA, an established product that is regarded as "one of, if not the best, SNA gateway out there," said David Passmore, a director at Gartner Group, Inc., a market research firm in Stamford, Conn.



At stake is a highly lucrative market — Novell, with its 31% share, is reaping $80 million annually with its NetWare for SAA gateway. More important, Microsoft hopes to use SNA Server to establish a beachhead for its NT Advanced Server within Novell's NetWare local-area network installed base, which analysts estimated comprises about 68% of total network operating system installations.

Beta-test user Aveo Financial Services, Inc. testified to SNA Server's power and ease of use. SNA Server "looked like one of the easiest products on the market to configure and manage," said Bill Mattox, systems consultant at the Irvine, Calif., financial company. And after three weeks of beta-testing, he said the product's performance has been up to par for 3270 applications. "Everything has been surprisingly smooth; I expected problems, but I really haven't found anything so far."

Aveo, an OS/2 shop, has not done a comparable evaluation of Novell's product.

IBM host connectivity will be only one of several application fronts where Novell and Microsoft will slug it out for dominance of client/server installations, Passmore said. More often, a company's choice of a client/server platform will determine its SNA gateway, he added.

The New York State Assembly, for example, has dismissed NetWare for SAA because its choice of a client/server platform is now down to Unix and NT, DeFeciani said. If Unix is picked, "We don't know what we'll use as an SNA gateway."

Where the two gateways will really go head-to-head is in the growing number of corporations that install Microsoft's NT Advanced Server as an application server and NetWare as their file server, Passmore said. Then it will come down to whether users buy Microsoft's argument that NT, with its protected-mode, multiprocessor architecture, will make a better gateway platform than NetWare.

Also affecting user choices will be how fast Microsoft can catch up with Novell in gaining the support, and thus the value-added features, of key communications hardware and SNA software products. For example, Bustech, Inc. and Memorex Telex provide NetWare for SAA with a host channel connection that SNA Gateway still lacks.

Service eases wireless data transfers

By Joanie M. Wexler
HOFFMAN ESTATES, ILL.

Wireless data networking got easier for information systems staffers last week: Ameritech Corp. unwrapped a service that lets mobile workers run data over cellular links without the IS personnel having to fiddle with the host computer site.

The regional telephone company's modem pool service allows laptop-toting users to wirelessly transfer files, query databases and send messages via an Ameritech site that houses modems running cellular protocols.

The Ameritech gear then converts those protocols into the wired protocols recognized by the customer's host — such as IBM Systems Network Architecture — and shuttles the communications on from there, explained Bill Boehm, manager of data support at Ameritech.

Such a service "would help us preserve our investment in the modem technology that we've deployed firmwide," said Sherry Sunderman, telecommunications partner at Andersen Consulting in Chicago. Andersen is piloting this and other wireless data services.

The worldwide management consulting firm has not yet made any decisions among the various wireless wide-area networking approaches such as circuit-switched cellular, emerging cellular digital packet data (CDPD) and packet radio protocols from the likes of Ardis and RAM Mobile Data, Sunderman said.

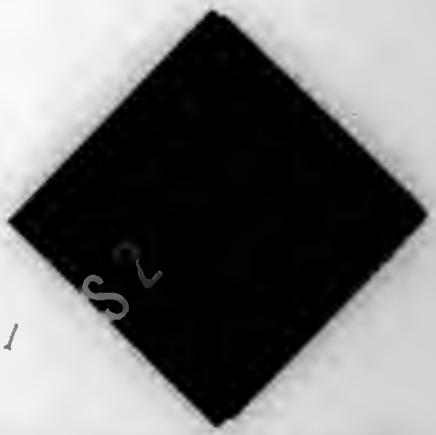
However, "our people are on the move constantly, and getting the right information when they need it is a high priority. We're not always in a position to connect in a land line mode," Sunderman said.

With 26,000 employees worldwide, it is important that Andersen monitor use and that the Ameritech service, dubbed Wireless Field Express, provide a monthly detailed list of data calls separated out from voice calls, she said.

To use the service today, mobile workers' laptops would need a cellular modem running the industry-standard MNP-10 connection protocol for circuit-switched cellular networks, Boehm said. The service eliminates the need for companies to outfit their host-site modems with cellular interfaces.

To accommodate different populations of users, Ameritech said it intends to soon add AT&T/Paradyne's Enhanced Throughput Cellular, a competitor to MNP-10. The carrier plans to support CDPD for statistical wireless data networking — where users pay by number of packets sent rather than for time connected — in 1994, Boehm said.

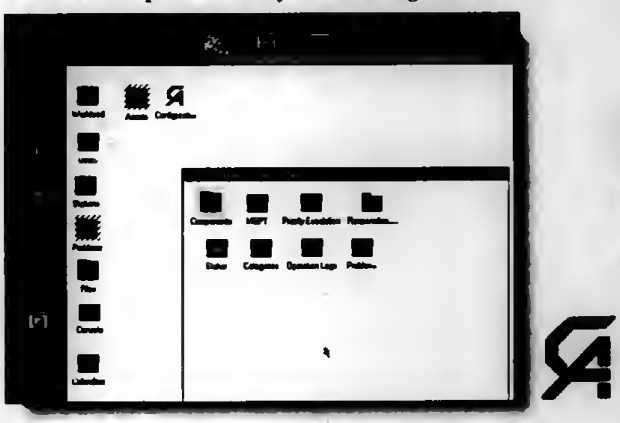
The MNP-10-based service is currently available in Chicago.



Where CA-UNICENTER delivers hard core protection.

When the mission is critical, you can't go soft on stability and reliability. Especially when LANs are at the center of your information processing solution. That's the thinking at the very core of OS/2. Now Computer Associates adds to those strengths, putting a distributed client/server spin on OS/2 systems management, and raising it to the level of host environments. Even surpassing them.

CA-UNICENTER for OS/2 builds on the reliability, stability and productivity of mainframe systems management, taking full advantage of the expertise and technology gained from more than 15 years experience. It combines industrial strength security management, work load management, problem management, console management and file management into one powerful, unified solution. And since it brings many familiar management features from your mainframe, CA-UNICENTER for OS/2 protects your existing staff and reduces the need for new staff, making it a highly cost-effective solution, too.



There's no need to break out of your shell: the CA-UNICENTER graphical user interface exploits the OS/2 Workplace Shell.™

With such rock-solid systems management, you could say CA-UNICENTER for OS/2 takes operating at a higher level to an even higher level. To order or to find out more about OS/2 2.1 or CA-UNICENTER for OS/2, call 1 800 3-IBM-OS2. In Canada, call 1 800 465-7999.

Operate at a higher level.™

IBM

IBM and OS/2 are registered trademarks and Workplace Shell and "Operate at a higher level" are trademarks of International Business Machines Corporation © 1993 IBM Corp.

Health fraud: Computers at war

CONTINUED FROM COVER 1

firms and managed-care companies are turning to sophisticated software that screens thousands of incoming claims for overcharges.

The expert systems come from little-known vendors such as Health Payment Review, Inc. in Boston, GMIS, Inc. in Malvern, Pa., and Medicode, Inc. in Salt Lake City. But they could become important soldiers in the Clinton administration's forthcoming assault on health care fraud and "profiteers."

Using the expertise of eminent physicians, the claims-auditing systems look for evidence of "code gaming," or manipulation of the five-digit codes for medical diagnoses and procedures to jack up the doctors' reimbursements.

Most medical fraud involves billing for work never done, but overpayments because of code gaming and errors amount to an estimated 1% of all health care spending, or about $8 billion last year, according to Marcia Radosevich, president of Health Payment Review.

Creative billing

One bill-padding technique is known as "code creep" or "upcoding," which means selecting a medical code for a more extensive surgical procedure or office visit than that which actually occurred. Another type of creative billing is "unbundling," where the doctor charges for individual tasks rather than using the less-expensive code that covers the whole procedure (see chart).

A 1991 spot check at one Medicare insurance carrier in Pennsylvania showed that code gaming produced overpayments of $468,397 in just two weeks, which is $12 million on an annualized basis, according to the inspector general at the U.S. Department of Health and Human Services.

Worst yet to come?

Code gaming may get worse if the Clinton administration's health care reform plan tries to roll back doctor's fees, experts said, because doctors will look for new tricks to make up for the loss of income.

Radosevich said that when the federal government cut reimbursements for anesthesiologists by 10% a few years ago, "all of a sudden we started seeing enormous unbundling problems and code creep problems" in claims submitted by anesthesiologists.

"Health care costs are like a water balloon," Radosevich said. "Push on one side, and it pokes out the other."



Unbundling medical codes

Doctors can raise their reimbursements by charging "a la carte" for separate tasks, rather than applying a single code that covers the whole procedure

Procedure code	Submitted bill	Payment
27570	Manipulation of the knee	$473
29870	Diagnostic arthroscopy	$1,371
29875	Limited synovectomy	$2,568
29881	Knee arthroscopy/meniscectomy	$2,670
	TOTAL:	$7,082
Recommended code and payment:		
29881	Knee arthroscopy/meniscectomy	$2,670

Explanation: Procedures 27570, 29870 and 27570 are routinely performed as integral parts of an arthroscopic meniscectomy and are included in the global code 29881.

Source: Health Payment Review, Inc., Boston



Coding enablers

Sampling of firms that sell coding software to health care providers for "optimizing reimbursement":

- **3M Health Information Systems**, Murray, Utah.
- **Cabot Marsh Corp.**, Bethlehem, Pa.
- **CodeMaster Corp.**, Chicago.
- **HCIA, Inc.**, Ann Arbor, Mich.
- **Health Care Information Systems, Inc.**, Beaverton, Ore.
- **St. Anthony Publishing, Inc.**, Alexandria, Va.

Fraud database

There is a nationwide database of doctors cited for malpractice, but there is no database for tracking medical billing fraud. To rectify that problem, U.S. Reps. Fortney H. (Pete) Stark (D-Calif.) and Charles E. Schumer (D-N.Y.) and U.S. Sen. William S. Cohen (R-Maine) have drafted legislation to create a national database of people guilty of health care fraud.



The claims-auditing software is typically used by insurance companies and others on the payer side of the health care street focused on cost containment.

At Tufts Associated Health Plans, Inc. in Waltham, Mass., for instance, the software saves the health maintenance organization $4.5 million a year, according to Bob Chin, vice president of information systems until last month.

Tufts runs an expert system called CodeReview from Health Paymeot Review on a Hewlett-Packard Co. HP 3000 minicomputer. CodeReview and its competitors flag suspicious charges for manual review.

On the provider side, there is a mini industry of seminar, newsletter and consulting firms that promise doctors they can boost their reimbursements through more aggressive coding. One such company offers physicians a training manual for "turning your coding department into a profit center."

"Ofteofimes the advice the consultants give is perfectly appropriate, hut some cross the line," Radosevich said.

Dueling systems

Several sources claimed that there are shady firms that sell software or provide billing services that antomatically change codes lo boost reimbursemeots. For example, they automatically unbundle the global code for a hysterectomy into five component codes, Radosevich said, and then CodeReview rebundles them back into the single code.

"It's a case of dueling expert systems," she said.

In addition to that underworld, there is a controversial category of software called "encoders." Vendors said the decisioo-support software was designed to help medical records personoel arrive at the right codes, but the software also includes logic modules called "optimizers" that show users other coding options that could produce higher reimbursement.

The goal is to prompt coders to search the medical record for conditions or treatments they may have overlooked, vendors said, so the providers get all of the reimbursement they are rightfully owed. One Philadelphia hospital using an optimizer boosted its reimbursement by $1,266 per Medicare patient, for example.

However, optimizers can be abused by people intending to "rip off the system," according to Kathleen Fyffe, director of payment systems at the Health Insurance Association of America in Washington, D.C.

In essence, the software provides a road map for code gaming without automatically doing it. Literature for CodeMaster Corp.'s encoder, for example, said its optimizer does the following:

"Displays all options to the current DRG (diagnosis-related group), indicating what the actual alternative DRG would he, the hospital-specific dollar amount for that DRG (whether increased or decreased) and the specific changes to the coding necessary to effect the change."

"My guess is that users don't automatically pick the highest-priced code. They pick the one that's best for the case," said Melinda B. Resser, director of sales and marketing at CodeMaster in Chicago.

'Not encouraged'

Another vendor is Health Care Information Systems, inc. in Beaverton, Ore. Asked whether his firm's InfoCoder supports code gaming, President Carl Cottrell said, "It allows them to do it, but it doesn't encourage it. The software shows coders what diagnoses they might be missing and gives them advice to get the exactly correct code."

Part of the problem is that selecting the right medical code is tricky and open to differences of opinion. "There is a fine line between working the system to get all you can legitimately — like the tax code — and making an intentional misrepresentation of what you did in order to get more money," said William J. Mahon, executive director of the National Health Care Anti-Fraud Association in Washingtoo, D.C.

Those doctors and hospitals that take aggressive coding positions see it as a way to fight back against the cost-cutters of the managed-care insurance community, experts said. "Their position is to let the big insurance companies catch it," said J. Eric Sandhusen, presideot of Review Associates in Chicago.

Sandhusen, whose company sides with doctors in Medicare disputes, added that sometimes the claims-auditing software goes too far by denying claims that are justified because the case was particularly difficult. "There is overreaching on both sides," he said.

Novell to pull messaging into NetWare

By Lynda Radosevich

Novell, Inc. will release in the coming weeks a version of Global MHS (Message Handling Service) that shares the directory services in NetWare Version 4.0 rather than requiring users to maintain separate network and electronic-mail directories, as is currently the case.

The company is also considering bundling the Global MHS software with NetWare 4.0, said Mark Ryan, a senior product manager at Novell.

"That would make my life much easier. I've got a huge, scary directory tree with links between the network directory, [front-end] mail directory and MHS directory," said Randy Bryant, a senior technical specialist at Hurco Manufacturing, Inc. in Indianapolis.

Time-saver

An updated version of Da Vinci's E-mail software — the leading front-end software for Novell's messaging engine — includes graphical administration tools. Beta-test user Randy Bryant, a senior technical specialist at Hurco Manufacturing, Inc. in Indianapolis, said he can add and delete users with a "point and click rather than typing in a long string of parameters."

Also, Novell will include basic MHS services for free in the unannounced Version 3.12, company officials said. The basic version of MHS, however, does not support non-MHS platforms as Global MHS does.

Novell's messaging strategy is gaining ground in large organizations, partly because of its plans to integrate messaging into network operating system software, according to network managers and industry observers.

That headway, they said, is expected to be made by using Novell messaging software as a "back-end" mechanism to link different desktop E-mail packages. This is similar to the X.400 or Simple Mail Transport Protocol used by Open Systems Interconnect (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP) networks.

For example, Jake Hoffman, technology coordinator for the state of Idaho, began using Global MHS in July to link 27 kinds of E-mail in divisions throughout the state. The most common denominator of the packages was that 70% of them ran on a Novell server, so he chose Global MHS for the common transport rather than the X.400 protocol.

Novell's messaging software, enables NetWare networks to receive, store and distribute E-mail. The basic MHS is widely used to support desktop E-mail software in local-area networks. A more advanced version, Global MHS, lets NetWare servers exchange mail and directory information with servers on IBM Systems Network Architecture, TCP/IP or OSI networks.

"We're more interested in MHS mainly because it supports other environments," Hoffman said.

To increase MHS awareness and show that it is serious about messaging, Novell last month moved its formerly separate messaging unit into its NetWare group.

MHS front-end software developers, such as Da Vinci System Corp., are counting on Novell's messaging push to launch their products from the LAN into enterprise networks. Last week, Da Vinci introduced a version of its E-mail software that uses Global MHS to update the E-mail directory when new users are added to the NetWare directory.

"With a version of Global MHS installed and shipping free with every NetWare, I'm not too worried about it catching on," said Bill Nussey, Da Vinci president and chief executive officer.

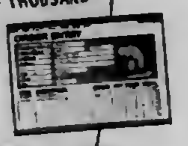
However, analysts noted Novell still has a long way to go before large companies view MHS as a strategic enterprise E-mail system. In a recent study of 100 Fortune 1,000 corporations, approximately 1.5% of 1 million mailboxes were based on Da Vinci's E-Mail, which is by far the market leader in MHS products, said David Ferris, editor of "Ferris E-mail Analyzer" in San Francisco.

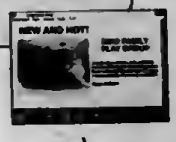
RemoteWare and the SEMINARS you missed

AT THE VERY MOMENT AN EXPERT WAS EXPLAINING THE COST- AND SANITY-SAVING BENEFITS OF REMOTEWARE-CREATED AUTOMATED WORKFLOW SYSTEMS TO A ROOMFUL OF HIS FELLOW CLIENT/SERVER AFICIONADOS [redacted] was sitting



in a tiny center seat, in coach, staring blankly at a fly nimbly exploring the OXYGEN PANEL above him. It had come down to a scheduling conflict. One more FREE product seminar, half-day, inevitably bad deli sandwiches... potato chips that had gotten too close to the kosher dills and gone soggy. Or this junket to clean up yet another set of branch communication difficulties in Opelika, St. Louis, and San Antone. So the picture of this fly on the ceiling RUBBING ITS FRONT LEGS TOGETHER with an ominous delight didn't have the significance for him it might have had he seen that MEANWHILE, BACK AT THE SEMINAR THE REMOTEWARE FOLKS WERE SPINNING COLORFUL TALES OF SUCCESSFULLY-IMPLEMENTED FIELD COMMUNICATIONS SYSTEMS, HOLDING CHARLIE'S TECHNO-PEERS FROM COMPETING COMPANIES CAPTIVE WITH THE PROMISE OF THOUSANDS OF FULLY-AUTOMATED, EASY-TO-MANAGE AND UNATTENDED DIAL-UP COMM SESSIONS, AND RIVETING ACCOUNTS OF REAL COMPANIES WITH HUNDREDS OF MOBILE CORPORATE LAPTOPS AND REMOTE BRANCH OFFICES USING CENTRALLY-CREATED AND MANAGED ELECTRONIC FORMS, DOCUMENTS, AND REPORTS, ALL LINKED TO CENTRAL SYSTEMS AND DATABASES, AND ALL NEATLY SUPPORTED BY INTEGRAL ELECTRONIC SOFTWARE DISTRIBUTION CAPABILITIES! So these were the things Charlie was missing: solutions to the very problems that had made this one more night away from home a necessity. That, and what actually turned out to be a delicious RemoteWare lunch of pasta salad, FRENCH BAGUETTES with prosciutto and mozzarella, and fresh strawberries.





But what did he know? He was headed to lunch with the fellas in San Antone. For bad deli sandwiches. And SOGGY CHIPS.

CALL 1-800-322-3366 NOW TO RESERVE YOUR FREE REMOTEWARE SEMINAR SEAT IN ONE OF THESE CITIES NEAR YOU: ATLANTA, BALTIMORE, BOSTON, CHICAGO, CLEVELAND, DALLAS, DENVER, DETROIT, EDISON, HOUSTON, KANSAS CITY, LOS ANGELES, MINNEAPOLIS, MONTREAL, NEW YORK CITY, NEW ORLEANS, PHILADELPHIA, SAN DIEGO, SAN FRANCISCO, SEATTLE, SALT LAKE CITY, TAMPA, WASHINGTON, DC

XCELLENET® Automating remote possibilities.

News Shorts

Microsoft offers more NT options

Microsoft Corp. last week formally rolled out a fee-based, tiered support program for Windows NT that it hopes will help entrench the recently released operating system in large corporate accounts. The new support program, to be implemented Oct. 1, is called the Microsoft Support Network.

Apple shows IBM-compatible hardware

In a sign of the times, **Apple Computer, Inc.** last week introduced its first hardware product designed exclusively for IBM-compatibles. The CD Multimedia Kit for PCs was among three new multimedia kits due in stores this week. Prices will range from $550 to $700. They include a Sony Corp. CD-ROM drive, a 16-bit sound card and stereo speakers from Apple.

Powersoft announces tools availability

Powersoft Corp. announced pricing and availability for PowerBuilder 3.0 last week as expected [CW, Aug. 16] and did the same for its PowerMaker and PowerViewer products targeting end users. All three products will ship by the end of the month and are priced at $3,595, $349 and $199, respectively. As an introductory offer, Powersoft will offer PowerMaker for $99 and PowerViewer for $49 through the end of November.

Digital's Alpha does Windows

As expected, **Digital Equipment Corp.** last week introduced a lower-cost version of its Alpha AXP microprocessor targeted for use in PCs running Microsoft's Windows NT and priced as low as $2,500. The 166-MHz DECchip 21066 has simulated performance ratings of 70 SPECint and 105 SPECfp and costs $385 in quantities of 5,000.

Sharp jumps on PDA bandwagon

Sharp Electronics Corp. said it would soon release a Personal Information Assistant, a cross between a personal digital assistant and a notebook computer that will include GeoWorks' Geos operating system. The PI-9000 will use both pen and keyboard input.

Management shake-up

Chicago-based systems integrator **Technology Solutions Co.** shook up its upper management late last week when its board asked for the resignations of company founder and Vice Chairman Albert D. Beedie Jr. and Vice Chairman Melvyn E. Bergstein. Their resignations come three months after both men relinquished their titles of co-chief executives.

Lotus mail catches up with rivals

Lotus Development Corp. is gearing up to follow electronic-mail rivals **WordPerfect Corp.** and **Microsoft Corp.** Lotus told attendees at the Corporate Computer Professional Exposition in Chicago last week that it will add support for sharing calendaring and scheduling notifications between IBM Profs and CC:Mail and Notes systems running Lotus Organizer. Both WordPerfect and Microsoft already provide this capability.

SHORT TAKES **The Wollongong Group** last week announced and began shipping the first network management platform to support Simple Network Management Protocol Version 2. Priced at $10,000, the Wollongong package got in just ahead of **Sun Microsystems, Inc.**'s SunConnect, which is scheduled to ship an SNMP V.2 version of SunNet Manager in the fourth quarter. . . . **KPMG Peat Marwick** announced last week it will begin providing systems integration services using **Next, Inc.**'s NextStep object-oriented software.

Feds to downsize with IT

CONTINUED FROM COVER 1

with sustaining itself to a government clearly focused on serving the people," Gore said.

"Information technology is going to be the most important tool for re-engineering functions in the government," agreed James J. Flyzik, co-leader of the NPR's information technology team and telecommunications director at the U.S. Department of the Treasury. "I think NPR management will showcase [information technology] largely because we have a champion in the vice president."

Gore's ideas, culled over six months mostly from efforts already under way in federal, state and local governments, include a national network serving law enforcement and public safety agencies; an integrated suite of government benefits distributed to holders of "smart cards"; electronic linkage of tax files at federal, state and local agencies; and the creation of a shared infrastructure that would knock down the walls separating the information systems in government agencies (see story below).

Asked why this effort to spruce up Uncle Sam's performance would succeed when so many earlier ones have failed, Flyzik said, "These are things government [information technology] managers want to do. Some of the reports in the past from outside consultants created a defensive posture."

Technology is ready

Charles N. Brownstein, co-leader of the information technology team and director of the Office of Planning and Assessment at the National Science Foundation, said technology is ready.

"For example, for government-wide E-mail, 10 years ago everyone would have had to write their own system. Now we've got Internet, X.400, multiprotocol routers and so forth," Brownstein said.

Fred Wood, senior associate at the U.S. Congress' Office of Technology Assessment, agreed that the maturity of technology today favors this latest reinventing government effort. "The Grace Commission [appointed by President Reagan] worked in a mainframe computer and plain-old-telephone-service environment, so the possibilities were far more limited than they are today," he said.

Wood said another positive factor behind the Gore effort is a stronger base of support in state and local governments, where the use of information technology to bring service improvements has blossomed in recent years. "It's no longer the case that the federal government is on its own," he said.

Flyzik said the information technology team was careful to avoid recommendations requiring long lead times, major new funding or new federal bureaucracies.

"We focused in on areas where there has already been a significant amount of effort," he said.

Electronic distribution

For example, the U.S. Department of Agriculture now distributes food stamps electronically in a number of places, and the NPR calls for the integration of additional benefits such as Medicare and Social Security payments.

Brownstein said most of the recommendations will be implemented by presidential orders, which will start flowing almost immediately. "Some of these things are just waiting to have a little structured authority around them."

He said President Clinton will establish interagency implementation teams with specific missions, schedules and outcomes that can be tracked.

"If I'm an [information technology] manager, I may hear about somebody doing something, but I don't pay much attention to it," Flyzik said. "But now there's a memorandum coming from the president that says if I want to build a program that distributes information to the public, there's a group over here coordinating all that, and I'd better start working with that group."

Virtual agencies

A key recommendation of the National Performance Review (NPR) is to develop an interagency information infrastructure.

"We need to look at what are the common elements the government needs for networks, computer centers, applications and so forth," said NPR information technology team co-leader James Flyzik. "We need to look at ways to share systems across government."

Flyzik and fellow team leader Charles Brownstein use terms such as "electronic government" and "virtual agency" to describe a government in which systems seamlessly mesh.

"We have the equivalent of a large data center sitting around on desktops all night long," Brownstein said. "We are not far from having operating systems that can use that power as a metacomputer to do large jobs at night or maybe without people noticing it while they are sitting around doing their word processing."

Client/server computing may obviate the need for a gigantic data center, Flyzik added. —*Gary H. Anthes*

NPR IT suggestions

The following are information technology recommendations from the National Performance Review:

▶ Overall:

- Provide strong leadership to integrate information technology into the business of government.

▶ Develop these "electronic government" applications:

- Integrated system for electronic benefits transfer.
- Electronic access to government data and services via 800 numbers, "kiosks" and electronic bulletin boards.
- A national network for law enforcement and public safety.
- Intergovernmental tax filing, reporting and payment processing.
- An international trade data system.
- A national environmental data index.
- Governmentwide electronic mail.

▶ Establish these frameworks:

- An integrated information infrastructure, including consolidated data centers.
- Systems and mechanisms to ensure privacy and security, including a Privacy Protection Board, privacy standards and a digital signature standard for unclassified data.
- Improved methods for information technology acquisition.
- Incentives for innovation, including performance-based contracting and a governmentwide venture capital fund for innovative information technology projects.
- Information technology training for federal employees; require certification for information technology managers.

SOURCE: "Creating a Government That Works Better & Costs Less — Report of the National Performance Review."

Rightsizing? Think Before You Leap.



Rightsizing With Information Builders Gives You The Right Solutions With Minimum Risk.

If bringing decision support and development to more desktops is in your future, how do you best integrate existing mainframe systems with new client/server solutions? And what about the extensive retraining needed during the transition?

Before you leap into "Rightsizing", talk to Information Builders. We can give you the answers because we understand the mainframe, midrange and desktop environments you work with. And we have the expertise to get you to tomorrow, safely. Just as we've been doing with all the Fortune 1000 for the last eighteen years.

PRODUCTS THAT WON'T LET YOU DOWN

Our rightsizing solutions, FOCUS, the client/server 4GL and EDA/SQL, the universal data access standard, are practical. They let you phase in the new with the old at a pace and budget that's right for your organization.

FOCUS is comprehensive. It gives you *all* the tools you need for application development and decision support on any platform. EDA/SQL provides access to *all* data on *any* platform.

And, our Professional Services group can provide a comprehensive program, from needs assessment to implementation and training to help you rightsize, cost effectively, and safely.

FIND OUT THE FACTS

Only Information Builders gives you rightsizing solutions that let you think about future possibilities, rather than create future problems.

So, before you leap, find out about our proven solutions or attend a FREE Seminar...

CALL 800-969-INFO
In Canada call 416-364-2760

Information Builders

FOCUS and EDA/SQL are trademarks of Information Builders, Inc., 1250 Broadway, NY, NY 10001

Announcing the first network printer



Operating System	*Topology*
Novell Netware	*Ethernet/802.3 *Token Ring (4/16 Mbps)*
Microsoft® LAN Manager	*802.3 *Token Ring (4/16Mbps)*
Windows for Workgroups	*802.3 *Token Ring (4/16 Mbps)*
Windows NT	*802.3 *Token Ring (4/16 Mbps)*
IBM LAN Server	*802.3 *Token Ring (4/16 Mbps)*
AppleTalk	*LocalTalk *EtherTalk*
*HP-UX***	*Ethernet*
*SunOS***	*Ethernet*
*Solaris***	*Ethernet*
SCO UNIX®	*Ethernet*

*Standard in the HP LaserJet 4Si MX printer. **For operating HP-UX, SunOS or Solaris, a one-time purchase of $199 in configuration software is required. Adobe and PostScript are trademarks of Adobe Systems Inc. which may be registered in certain jurisdictions. Microsoft is a U.S. registered trademark of Microsoft Corporation. UNIX is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries. †In Canada call 1-800-387-3867, Ext. 7299.
© 1993 Hewlett-Packard PE12353

Multiple environments are no longer worlds apart. Even if you have Novell Netware on one network, HP-UX on another and EtherTalk on a third, the new HP LaserJet 4Si MX printer easily connects across platforms. Automatically.

The HP LaserJet 4Si MX printer comes out-of-the-box preconfigured for multiple environments. There's nothing more to do than plug-and-play. All interfaces are simultaneously hot, making switching so seamless, end-users won't even notice.

What's more, HP's LaserJet 4Si MX printer is ready to handle whatever needs come down the

that adapts to multiple environments.



pike. More operating systems? No problem. As your network system continues to evolve, the capabilities of this printer are no longer just impressive. They're indispensable.

The HP LaserJet 4Si MX printer is loaded with features that define state-of-the-art. HP's enhanced PCL5 and genuine PostScript™ Level 2 software from Adobe™ come standard. Printer environments are saved while switching. Setup is a cinch with network software utilities and drivers included in the box. And, if you need any reassurance about trouble-free operation, you have it in our Simple Network Management Protocol (SNMP) support.

At 17 ppm, this is the fastest LaserJet ever, with I/Os and RISC-based formatter capabilities matched to support its speed. It delivers impeccable 600 dpi print quality—thanks to HP's microfine toner and Resolution Enhancement technology. Plus, it comes standard with two 500 sheet input trays.

But what if you don't need the full capabilities of the HP LaserJet 4Si MX printer right away? HP offers another printer that's probably a perfect fit. The HP LaserJet 4Si printer delivers the identical 17 ppm performance and superb 600 dpi print quality. It also has room to grow. The two MIO expansion slots let you add HP JetDirect network interface or third party cards. And you can add on Adobe's genuine PostScript Level 2 software and SIMM memory modules, as you need them.

To find out more about the multiple-network HP LaserJet 4Si MX printer and the upgradable HP LaserJet 4Si printer just call 1-800-LASERJET, Ext. 7299.† Capabilities this advanced make a world of difference—in any environment.

HEWLETT PACKARD

IBM to skirt Windows

CONTINUED FROM COVER 1

which reworks the code to achieve similar functions, one source close to IBM said. "And to do it in ways other than through the source code, which must be licensed from Microsoft," he added.

The technical goal of the project is to "make it fit with whatever users already have in place," said another source in the developer community.

An IBM spokesman declined to comment on the company's plans.

Some users said they are skeptical about IBM's ability to compatibly emulate Windows because they believe Microsoft will do its best to be a fast-moving target.

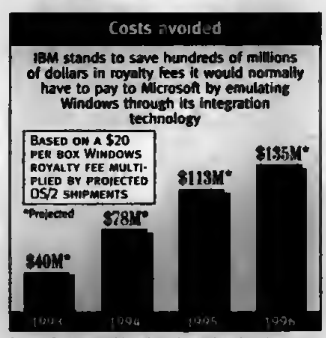
"If you look at the trouble [IBM] had with Windows apps under [OS/2] Version 2.0, I can't imagine the trouble they'll have with future versions of Windows," said one information systems manager at a large East Coast bank.

Some developers interviewed last week about the IBM internal project said they believe it is possible for IBM to strictly and legally emulate Windows' functions, but they added that it is far from a lightweight task.

"It sounds like a lot of work, but maybe the royalties are high enough that it could be worth the effort," said Paul Grayson, chairman at Micrografx, Inc.

IBM could deliver the technology in a variety of ways. One way is to sell a shrink-wrapped version of OS/2 equipped with the technology through retail stores. However, the company is exploring several alternatives, including electronic distribution, sources said, and has yet to settle on a primary distribution strategy.

As part of the "divorce settlement" hammered out by both companies last year, IBM has been paying Microsoft approximately $20 for every copy of OS/2 it sells, according to sources.



Source: *Computerworld* royalty estimates based on data provided by IBM and Microsoft. OS/2 projections based on International Data Corp. and InfoCorp estimates.

IBM had sold about 2 million copies of OS/2 2.0 as of year-end 1992. In June, the company announced it had shipped 250,000 copies of OS/2 2.1, just four weeks after it became available. Based on those figures, IBM probably paid Microsoft around $40 million in 1992 and is on a pace to pay another $40 million this year.

Under the terms of last year's agreement, both companies are obligated by midnight Sept. 16 to exchange all DOS, Windows and OS/2 source code from products both finished and still under development.

No code concerns

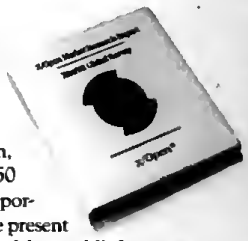
IBM officials have consistently said during the past year that they are not especially concerned about getting source code from finished and unfinished DOS and Windows products, including the unreleased 32-bit version of Windows, known as Chicago, but excluding Windows NT. IBM has full rights to clone Windows application programming interfaces, either with or without the use of the source code, in perpetuity.

This is the code that figures to be crucial if IBM is to continue making good on its promise that OS/2 will be "the integrating platform" for applications that are compatible with a variety of different operating systems.

Microsoft has the same rights with OS/2 source code in perpetuity and must pay IBM for any code it uses in future products. The company does not have rights to code from IBM's upcoming WorkPlace OS, the kernel of which comes from Carnegie Mellon University.

OUR NEW I.T. STUDY OFFERS EARTH-SHAKING INSIGHTS ABOUT THIS CRITICAL MARKET.





Introducing The World's Most Complete Study Of Open Systems Trends And Requirements.

If you had access to a new source of up-to-date, reliable facts about the worldwide information technology market, you could improve sales and reduce costs. And step ahead of your competitors.

SURVEY COVERS
- 40 Countries
- 6 Continents
- 57 User Groups
- 6 Languages
- 69% of the World's Population
- 82% of the World's GNP

That source is Global Directions '93, our authoritative study on global I.T. trends. It's the most comprehensive user study ever fielded, and includes hard numbers on ROI as well as case studies featuring some of the world's most successful companies.

Attend The Conference.

The best way to learn about the information we've uncovered is to attend the XTRA '93 Congress in Rome on the 7th, 8th and 9th of December. 450 participants will have the opportunity to meet and discuss the present and future of I.T. with some of the world's foremost users and industry leaders. Plus, through special presentations, participants will have access to a level of data analysis and conclusion-drawing unavailable to those not attending.

Or Order Your Copy Of The Survey Today.

Even if you can't make it to Rome, you can still buy a copy of this ground breaking survey. And put its insights to work in your enterprise.

For information on the XTRA '93 Congress or to order the survey, call 800-779-6736 or fax a copy of your business card to 703-876-0050. Before your competitors do.

X/Open

The World's Standard For Open Systems.

© 1993 X/Open Company Ltd. All rights reserved. X/Open and the X device are trademarks of X/Open Company, Ltd. in the U.K. and other countries.

Communicate At Breakthrough Speeds.



Get AT&T's SYSTIMAX® Structured Cabling Systems, And Get Speeds Beyond 100 Mbps.

Over copper. Or fiber. Your network can now have unprecedented speed and interoperability. All by installing AT&T's SYSTIMAX Structured Cabling Systems, with our HIGH-5™ product family of Category 5 components. They support today's network applications and emerging technologies like ATM, up to speeds of 155 Mbps. And this total solution offers you end-to-end connectivity, maximum network compatibility and the ability to evolve your network as your future needs change. All from a single, reliable source. AT&T's HIGH-5 products come with a 15-year extended product warranty, and they exceed EIA-568 Category 5 specifications. The copper cabling was created by AT&T Bell Laboratories and has become the benchmark for Category 5 standardization testing. So find out how AT&T's SYSTIMAX Structured Cabling Systems can help you break through communications barriers. Call us at: **1 800 344-0223, ext. 3013.** Outside the U.S.: **602 233-5855.**

AT&T Network Systems And Bell Laboratories. Technologies For The Real World.

AT&T
Network Systems

©1993 AT&T

And you were told Pentium was powerful.

If you've heard the Pentium™ microprocessor was powerful, it's time you see the PowerPC™ Microprocessors from Motorola. To be perfectly candid, Pentium is fairly powerful, but it's not nearly as powerful as the PowerPC family of microprocessors.

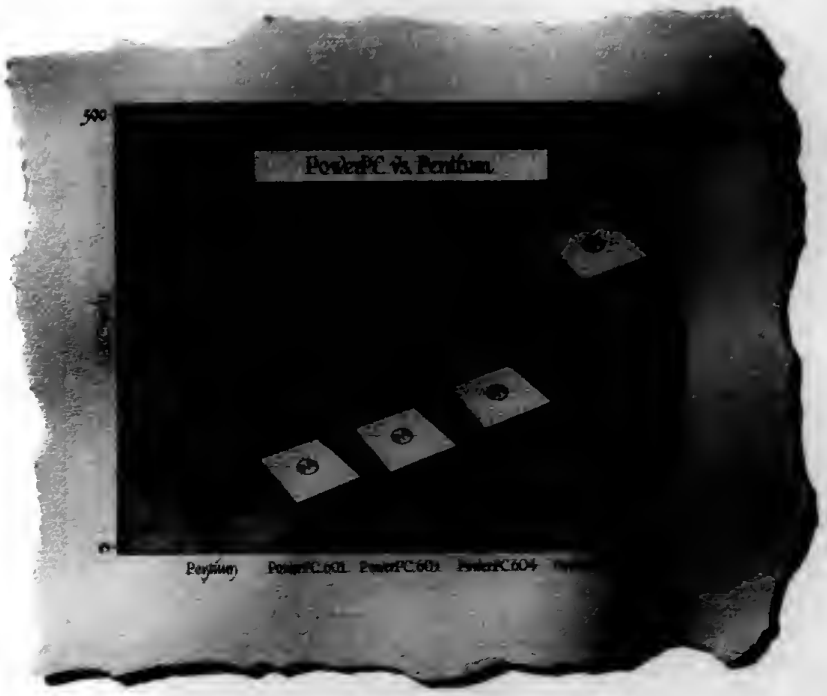
The first of Motorola's PowerPC Microprocessors, the PowerPC 601™ Microprocessor will bring workstation-like performance to low-cost PCs. Its integer performance (how fast it handles basic computer functions) is equal to Pentium's. In floating point performance (the speed you need to crunch numbers, run graphics, video, voice and the like), the 601 is a full 40 percent faster than Pentium, with no loss in integer performance.

While the 601 outruns Pentium, it actually runs cooler. The 601 draws only 8.5 watts of power to 16 watts for Pentium which, incidentally, leads to lower overall system costs.

The 601, of course, is only the beginning. Over the next eighteen months, we'll ship ever more



©1993 Motorola, Inc. Motorola and Ⓜ are registered trademarks of Motorola, Inc. PowerPC, PowerPC 601, PowerPC 603, PowerPC 604, PowerPC 620 and the PowerPC logo are trademarks of IBM Corporation. Pentium is a trademark and Intel is a registered trademark of Intel Corporation. All rights reserved. Speed comparisons are based upon press reports of performance of the 66MHz version of the Pentium as announced by Intel, and Motorola's announced simulation performance of the 66MHz version of the MPC601. Thermal comparison is based upon preliminary Intel specification for the 66MHz Pentium, and the performance of samples of the 66MHz version of the MPC601.



powerful versions of the PowerPC Microprocessor. The low-wattage PowerPC 603™ Microprocessor will bring unprecedented performance to battery-powered computers. The PowerPC 604™ Microprocessor will push high-end PC and server performance to new highs. The PowerPC 620™ Microprocessor will run at 200 to 400 SPECmarks in high-end workstation, server and supercomputer applications.



To take a closer look at the future of computing, call Motorola today at 1-800-845-MOTO. We'll be happy to provide you with more information, including our free PowerPC Information Pack.

PowerPC Microprocessors from Motorola. They have the power to take you further into the future than the competition.

PowerPC Microprocessors. *Changing the course of computing. For the better.*

MOTOROLA

Chemical maker profits from notebooks

By Michael Fitzgerald
NAPERVILLE, ILL.

Nalco Chemical Co., the world's largest specialty chemical manufacturer, last week began Phase III of a homegrown sales force automation project that it said has demonstrably increased its customer satisfaction levels and directly led to $26 million in sales in its first six months.

Nalco's project was driven by its sales group, with only one information systems member on the team that created the Nalco Computer Assisted Services (N-COMPAS) system.

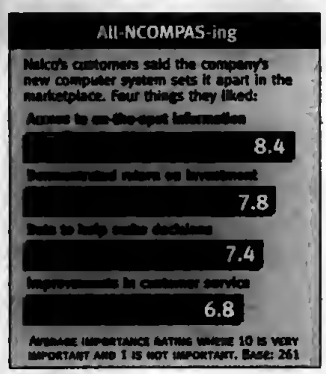
When the system is fully rolled out by the end of 1994, it will add traditional sales force automation tools such as contact management as well as specific sales force requests.

The notebook-based sales tool gives salespeople the ability to do the kind of on-the-spot information analysis that was previously locked in the $1.3 billion firm's mainframes.

Analysts said Nalco's effort to move valuable data off the mainframe and into the hands of salespeople is becoming a more common approach to doing business, thanks to a marked increase in the power of notebook computers.

"Where customer care divides the winners and losers in the 1990s, this is the kind of thing to put out in the field," said Barton Goldenberg, president of Information Systems Group, Inc., a Washington, D.C., consultancy.

Nalco last week ordered 600 notebooks to complete its rollout to the 1,260-member domestic sales force. All of its 386SX and 486SL-based notebooks run Micro CAPE, or Computer Assisted Program Evalution, a suite of proprietary analytical programs it had ported from its mainframes.



Source: Walker CSM

A 250-member first phase was able to demonstrate that using the notebooks helped save $12 million in existing business as well as generate $14 million in new business during the project's first six months. Nalco officials declined to comment on sales generated since that time.

Keep customers happy

Increased sales were only part of the reason that Nalco management committed to the notebook project.

"We have to justify everything we do, and the only way we could expand the project beyond its initial stage was if we could prove that we had increased customer satisfaction," said Brent Richards, manager of sales training and chairman of the committee that developed N-COMPAS (see chart).

The 45 packages in Micro CAPE are directly responsible for this increase, according to Richards. Designed to give the Nalco sales representative access to a wide variety of analytical information needed to help customers, salient features include predictive analysis software for "what-if" scenarios; statistical process-control analysis; program optimization; return on investment computations; inventory management; and service reports.

Finding the Solution You Need Gets Easier on September 27

Announcing Computerworld's 1994 Consultants Directory



A special pullout-and-save section appearing in Computerworld's September 27 issue

The solution you're looking for is now at your fingertips. Computerworld's Consultants Directory is a comprehensive listing of solutions providers across the U.S. Our Consultants Directory gives you quick and easy access to outside IT providers including systems integrators, consultants, and application developers.

Solutions providers whose services cover the range of your information technology concerns — from client/server computing, CASE, 4GL, applications development to education/training and information reengineering. With listings referenced by state and by speciality, this is one reference source you'll want on your desk throughout the year.

COMPUTERWORLD
The Newspaper of IS

Computerworld's Consultants Directory. Look for it in our September 27 issue.

An International Data Group Publication

SEPTEMBER 13 1993

COMPUTERWORLD

HOW THE BEST ARE PLAYING THE NEW BUSINESS GAME

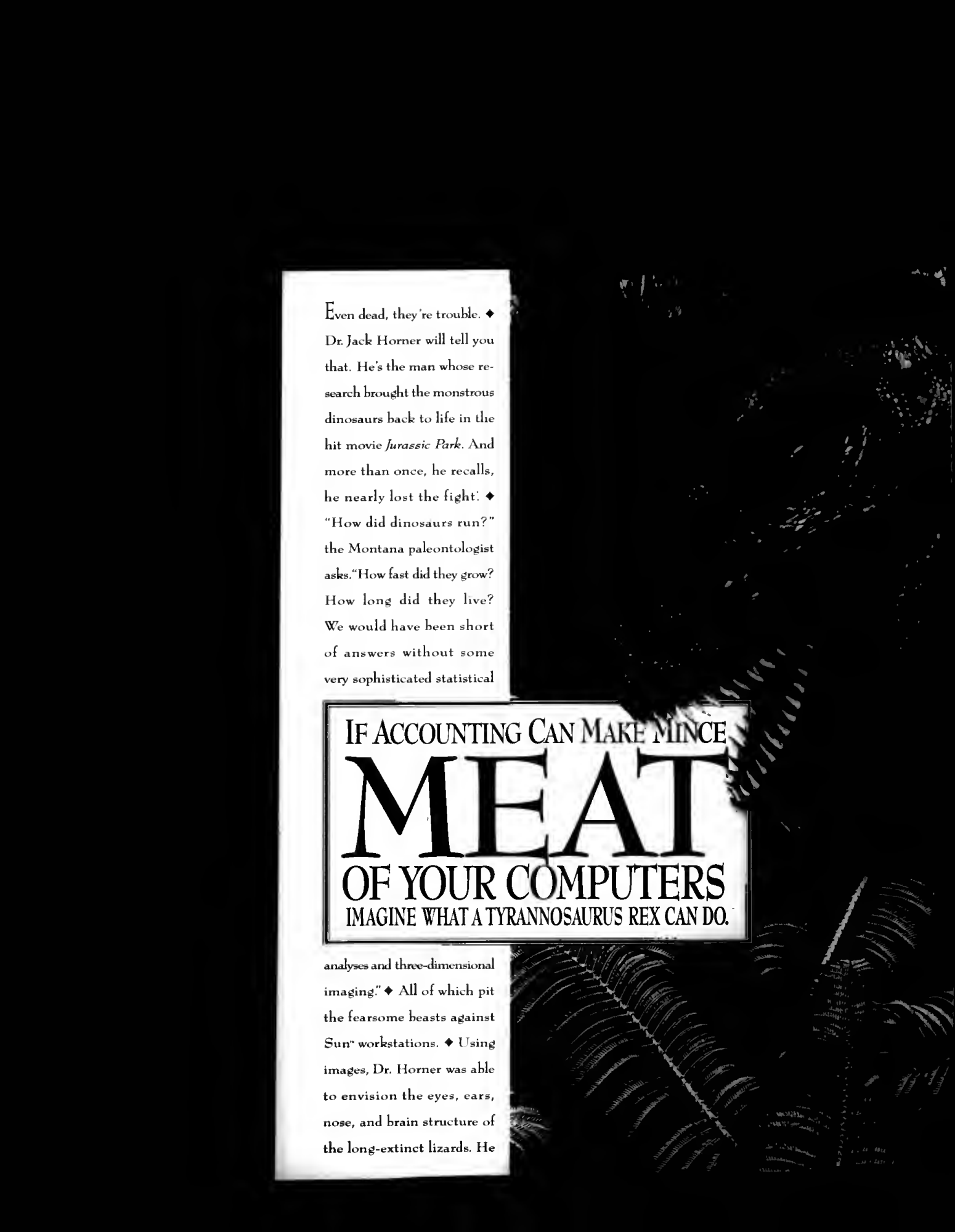












Even dead, they're trouble. ◆ Dr. Jack Horner will tell you that. He's the man whose research brought the monstrous dinosaurs back to life in the hit movie *Jurassic Park*. And more than once, he recalls, he nearly lost the fight. ◆ "How did dinosaurs run?" the Montana paleontologist asks. "How fast did they grow? How long did they live? We would have been short of answers without some very sophisticated statistical analyses and three-dimensional imaging." ◆ All of which pit the fearsome beasts against Sun™ workstations. ◆ Using images, Dr. Horner was able to envision the eyes, ears, nose, and brain structure of the long-extinct lizards. He

IF ACCOUNTING CAN MAKE MINCE MEAT OF YOUR COMPUTERS IMAGINE WHAT A TYRANNOSAURUS REX CAN DO.



was also able to look at them three-dimensionally, right on the screen, from every conceivable angle, testing theory against fact. ◆ Using Sun, Dr. Horner was soon able to pin dinosaurs down, quantifying how well they could hear, even how they sounded. ◆ And what might a dinosaur say, should one meet you? ◆ Mostly, a kind of growling. ◆ "They weren't very intelligent," Horner says. ◆ But they were pretty hungry. ◆ Sun computers. Just the thing to handle a towering lizard, or whatever monstrous task you're facing. ◆ More than one million people are using Sun systems, powered by the SPARC® chip and the Solaris® operating environment, to gain a competitive advantage. Jack Horner is just one. To learn how you can benefit, call 1-800-426-5321, ext. 605.

Sun

Sun Microsystems Computer Corporation
A Sun Microsystems, Inc. Business
© 1995 Sun Microsystems, Inc

The Network Is The Computer™

COMPUTERWORLD PREMIER 100

EDITOR
Joanne Kelleher
RESEARCH MANAGER
Michael Sullivan-Trainor
MANAGING EDITOR
Joyce Chutchian-Ferranti
DESIGN DIRECTOR
Nancy Kowal
ASSISTANT MANAGING EDITOR
Anne McCrory
WRITERS
David Baum
Julia King
Alice LaPlante
Alan Radding
RESEARCHER
Erin Callaway
CHIEF COPY EDITOR
Catherine McCrorey
COPY EDITORS
Kimberlee A. Smith
Steven J. Condon
Christina Aicardi McGuire
Jill Zolot
Ellen Fanning
DESIGNERS
Janell Genovese
Stephanie Faucher
PRODUCTION MANAGER
Beverly Wolff
ADVERTISING COORDINATOR
Paula Wright

EDITOR IN CHIEF
Bill Laberis

Copyright 1993 by CW Publishing, Inc. All rights reserved. Computerworld can be purchased on 35mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich., 48106. Photocopy rights. Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing, Inc. for libraries and other users registered with the Copyright Clearance Center provided that the base fee of $3 per copy of the article, plus 50 cents per page, is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Mass., 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing, Inc., 375 Cochituate Road, Box 9171, Framingham, Mass., 01701-9171. Subscriptions call toll free (800) 669-1002. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $6 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So America — $130 a year; Europe — $195 a year; all other countries — $295 a year (airmail service).

Cover design: Tom Monahan. Cover photography (clockwise) by: Brian Smale, Michael Abramson, Alain Keler/Matrix, Jack Van Antwerp.

CONTENTS

4
DRAWING OUTSIDE THE LINES
By Joanne Kelleher
In a tough year, innovation and effectiveness go hand-in-hand.

8
IT'S ALL IN THE NUMBERS
By Michael Sullivan-Trainor
Insights into the priorities and concerns of *Premier 100* IS execs from our annual trends survey. Sneak preview: Money worries are giving way to concerns about creating new applications.

10
EXPEDITE!
By Alice LaPlante
No matter what business you're in or what process you're trying to improve, the basic goal these days is to get information to the front lines ASAP.



13
THE GREAT PLATFORM LEAP
By Alan Radding
Premier 100 IS managers wrestle with the confusing array of relational databases, legacy data and new technologies.



18
BEHIND EVERY GREAT CIO IS A CHIEF EXECUTIVE
By Michael Sullivan-Trainor
CEOs talk technology and tactics.

20
CEO INTERVIEW
By Joyce Chutchian-Ferranti
Helene Curtis' Ronald Gidwitz shares his vision for effective information deployment.

22
THE REINCARNATED ORGANIZATION
By Joanne Kelleher
Effective IS organizations are rapidly and often radically transforming themselves to keep pace with the changing world around them.

26
SMART RATIONING
By Julia King
When you don't have a lot of money to spend, a little creativity can go a long way.

PHOTOGRAPHY BY SIMON GRIFFITHS (LEFT) AND REID HORN (RIGHT)



The Computerworld Premier 100 team: *(from left): Anne McCrory, Joanne Kelleher, Nancy Kowal, Erin Callaway, Joyce Chutchian-Ferranti and Michael Sullivan-Trainor.*

29
BRAIN STRAIN
BY DAVID BAUM
Getting IS professionals to adapt quickly to new technologies and new working methods is a real challenge. Here's how some top companies are doing it.

36
TEAM PICTURES
BY JOYCE CHUTCHIAN-FERRANTI
Glimpses into what can happen when business and IS put their heads together.





38
DO TRY THIS AT HOME
BY ERIN CALLAWAY
More ideas you can use from *Premier 100* organizations.

43
WHATEVER HAPPENED TO...
BY MICHAEL SULLIVAN-TRAINOR
Why some familiar names are no longer on our list.

48
MAKING THE GRADE
How industry competitors rate one another and a look at our new chief executive and management criteria.

45
METHODOLOGY
A guide to how we rank the *Premier 100* companies.

50
THE PREMIER 100 AT-A-GLANCE TABLES
Comprehensive charts listing key IS and ranking data for 10 industry groups from aerospace to utilities.

59
REFERENCE LIST
An alphabetical listing of *Premier 100* companies and their IS leaders.

PHOTOGRAPHY BY STELLA JOHNSON (TOP), JAMES SCHNEPF (MIDDLE) AND TOM ZIMBEROFF (BOTTOM)

Drawing outside THE LINES

THE BEST RULE THESE DAYS is that there aren't any rules, and if there is one attribute shared by this year's *Premier 100* organizations, it is their willingness to jettison old conventions and work in that dangerous white space where there are no preconceptions about how things should be done.

The spirit is infectious. We've also made some rather significant alterations this year, both in our selection process and in the information we present about these outstanding information systems organizations.

We've expanded our evaluation to take into account many factors that bear on excellence of technology management, including but not limited to assessments from top executives of these companies about the value that technology is adding to the business. We've also tried to give readers a closer look at the kinds of things these companies are doing with technology and the philosophies behind their actions.

When companies or people are chosen for this kind of honor, the question naturally arises: "What makes them so good?" We hope that by the time you've finished reading you'll have your answer *and* a scratch pad full of notes about tactics you might want to try.

As Michael Sullivan-Trainor, research manager and initiator of the *Premier 100*, makes clear in his

AEROSPACE	CONSUMER PRODUCTS AND SERVICES	FINANCIAL SERVICES	INDUSTRIAL AND AUTOMOTIVE PRODUCTS	MANUFACTURING
1 The Boeing Co.	1 Dibrell Brothers, Inc.	1 Banc One Corp.	1 Cummins Engine Co.	1 Rubbermaid, Inc.
2 Martin Marietta Corp.	2 Hon Industries, Inc.	2 Mellon Bank Corp.	2 Harley-Davidson, Inc.	2 Phelps Dodge Corp.
3 Northrop Corp.	3 The Dun & Bradstreet Corp.	3 Prudential Insurance Co.	3 Great American Management & Investment, Inc.	3 Westvaco Corp.
4 Allied Signal, Inc.	4 Helene Curtis Industries, Inc.	4 Chemical Banking Corp.	4 Outboard Marine Corp.	4 Bandag, Inc.
5 Grumman Corp.	5 Marriott Corp.	5 The Travelers	5 Deere & Co.	5 Raychem Corp.
6 Gencorp, Inc.	6 Reader's Digest Association, Inc.	6 Bankers Trust New York Corp.	6 Caterpillar, Inc.	6 Cone Mills Corp.
7 Textron, Inc.	7 Kellwood Co.	7 Crestar Financial Corp.	7 Navistar International Corp.	7 Polaroid Corp.
8 McDonnell Douglas Corp.	8 Browning-Ferris Industries, Inc.	8 Cigna Corp.	8 Harnischfeger Industries, Inc.	8 West Point-Pepperell, Inc.
9 General Dynamics Corp.	9 International Flavors and Fragrances, Inc.	9 American Express Co.	9 Nortek, Inc.	9 Willamette Industries, Inc.
10 Raytheon Co.	10 Emerson Electric Co.	10 Primerica Corp.	10 Tecumseh Products Co.	10 3M Co.

discussion of our annual Trend Survey, these companies and these IS executives do not live in some trouble-free parallel universe (see story page 8). They are struggling hard to keep budgets in trim, improve productivity and reduce inefficiencies of all kinds.

The companies listed below are grappling with those problems and many others and they are winning. Furthermore, they are making smart and aggressive use of information systems to do it.

Importance of teamwork

Chief executive officers and other top executives from *Premier 100* companies also take turns discussing what exactly they expect from their IS departments and their IS executives and how they view their own role in enabling the contribution.

In a one-on-one with managing editor Joyce Chutchian-Ferranti, Ron Gidwitz, CEO of cosmetics giant Helene Curtis Industries, describes his part as cheerleader to Thomas Gildea's technology quarterbacking.

Unorthodox? Maybe. But then there is very little that's down-the-line conventional about the ways in which IS departments are now orienting and organizing themselves.

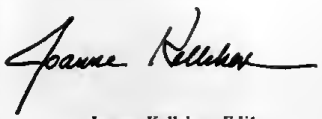
You'll notice the word "team" pops up a lot. Team formation is only one aspect of the changes sweeping across the IS function. In an increasing number of instances, systems personnel are blending into other departments, becoming technically savvy members of the marketing department or distribution or whatever.

Some IS staffers are attending creativity seminars to break the hold of old habits. Others are climbing mountains together to learn the value of cooperation. Still others are leaving their keyboards to stand behind cashiers' desks or field customer calls, doing what Wal-Mart Executive Vice President Bob Martin refers to as "eating what we cook."

That cooking is taking place at microwave speed, too, as modular and iterative system development becomes the order of the day and, for many, applications become something you create today for possible replacement in six months.

These are big, difficult adjustments, but *Premier 100* companies tend to accentuate the positive. If systems are built quickly and obsoleted quickly, IS staffers aren't chained to the grind of maintenance for years at a time. Or if someone over at the plant has an idea for a system and you know you won't have a free hand or a free hour, then maybe the thing to do is give that person some funds and let him hire a contractor to go ahead without you.

Would you think of doing that? Well, Dan Dvorak at Whitman Co. subsidiary Pepsi Cola General Bottlers would, in fact, he did, and the system was a raging success. This drawing outside the lines thing really *can* work.



Joanne Kelleher, *Editor*

Acknowledgments

Computerworld *thanks the following consultants and research firms for their help in creating this year's* Premier 100: *Richard H. Nahmias, principal, Nahmias & Co.; G. Michael Ashmore, vice president, CSC Index, Inc.; Howard Rubin, president, Howard Rubin Associates, Inc.; First Market Research Corp.;* Computerworld *Database Division; and International Data Corp. We would also like to thank all the IS executives and their staffs for their time and patience in responding to our many inquiries.*

PETROLEUM AND CHEMICALS	PHARMACEUTICALS FOOD AND BEVERAGES	RETAILING AND WHOLESALING	TRANSPORTATION	UTILITIES
1 Air Products and Chemicals, Inc.	1 Abbott Laboratories	1 Winn-Dixie Stores, Inc.	1 Alexander & Baldwin, Inc.	1 US West, Inc.
2 Engelhard Corp.	2 Becton, Dickinson & Co.	2 Dillard Department Stores, Inc.	2 AMR Corp.	2 Duke Power Co.
2 Oryx Energy Co.	3 Hershey Foods Corp.	3 Carter Hawley Hale Stores, Inc.	3 Yellow Corp.	3 Carolina Power & Light Corp.
4 Rohm & Haas Co.	4 Kellogg Co.	4 Albertson's, Inc.	4 Roadway Services, Inc.	4 MCI Communications Corp.
5 Unocal Corp.	5 Pet, Inc.	5 JC Penney Co.	5 American President Cos.	5 SCECorp
6 The B. F. Goodrich Co.	6 Hormel Foods Corp.	6 Wal-Mart Stores, Inc.	6 Federal Express Corp.	6 GTE Corp.
7 Vulcan Materials Co.	7 Merck & Co.	7 The Limited, Inc.	7 Airborne Freight Corp.	7 Northeast Utilities
8 Sherwin-Williams Co.	8 Schering-Plough Corp.	8 Food Lion, Inc.	8 Union Pacific Corp.	8 Southwestern Bell Corp.
9 Amerada Hess Corp.	9 The Quaker Oats Co.	9 McDonald's Corp.	9 UAL Corp.	9 FPL Group, Inc.
10 FMC Corp.	10 Whitman Corp.	10 The Home Depot, Inc.	10 Consolidated Freightways, Inc.	10 AT&T

THE MAN WHO MADE DISCONTENT AN ART FORM, AND THE COMPUTER HE GREW TO FEAR.

The croissants? Too dry. The coffee? Tasteless. The service? Intolerable. The management? Imbeciles. ◆ He is your worst nightmare. He is a bad customer. He could be the son of a concierge. ◆ For the ticket agents behind the Air France counters, however, Emil Gaston is no longer someone to fear. ◆ Armed with Sun™ servers, Air France agents now delight in meeting his every need, and frustrating his deepest desires. ◆ Ticketing is faster. So, too, are answers to questions about flights, availability, connec-



tions, and fare options. And because Sun servers link a worldwide network of 3,650 ticket terminals to a high-speed local network, every agent is able to torment the demanding with superior service. At a cost to Air France that is actually lower than before. ◆ And for customers like Emil Gaston, the urge to critique must find expression elsewhere. ◆ Unfortunately, for many businesses, it is a small world. ◆ More than 135,000 companies are using Sun systems, powered by the SPARC® chip and the Solaris® operating environment, to gain a competitive advantage. Air France is just one. To learn how you can benefit, call 1-800-426-5321, ext. 605.

Sun

Sun Microsystems Computer Corporation
A Sun Microsystems, Inc Business
© 1993 Sun Microsystems, Inc

The Network Is The Computer™

IT'S all IN THE numbers

BY MICHAEL SULLIVAN-TRAINOR

The phrase "on the horns of a dilemma" could have been coined to describe the state of mind of *Premier 100* information systems executives in 1993. Every year we survey these leading executives about the issues, trends, challenges and choices they are facing. This year, it's clear that the often-opposed goals of budget-cutting and new application creation are, and will continue to be, the major preoccupations for these IS chiefs at least through next year.

For 1993, budget cutting and budget stretching have been foremost on the minds of IS executives: 45% put budget pressures at the top of their list of current challenges. But looking ahead and bearing an increased clamor for fresh systems, survey respondents reversed the order of top priorities for 1994 and emphasized demand for new applications.

Pressure points

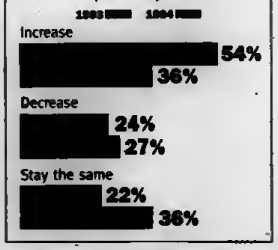
Demand for new applications will soon outweigh budget pressures for the majority of IS executives, but business management expectations will also become more of an issue

	1993	1994
Budget pressures	1	2
Demand for new applications	2	1
Platform downsizing	3	4
Business management expectations	4	3
Network integration	5	6
Need for staff retraining	6	7
System integration	7	5

(Ranking based on 64 *Premier 100* companies that named each issue as their biggest challenge)

Budget bounces

Percentage of respondents whose budgets are changing or remaining the same from the previous year



Resource stretch

This is no indication that IS executives expect to be rolling in resources anytime soon. Corporate wallets did open up a bit this year, but many who reported budget hikes this time around expect flat budgets next year. What the responses do seem to reflect, however, is the fact that the performance bar is rising rapidly for IS, as top managers look to information systems to help them make companies leaner, more responsive and more competitive.

In fact, business management expectations, which only 12% mentioned as a major challenge for 1993, take a major leap as IS executives contemplate challenges for 1994. Almost a third see satisfying these expectations as one of their biggest looming tasks.

Expectations

The expectations of top corporate management are certainly a factor. While the number of IS executives who reported increased scrutiny from

How Will Your Organization Benefit From Sun?
1-800-426-5321, ext. 605.

Please send me more information about Sun systems, and how they can give me an advantage.

I Am A Sun™ SPARC® User:
01 ❑ Yes 02 ❑ No

My Industry Is:
25 ❑ Aerospace
27 ❑ Automotive
11 ❑ Education
28 ❑ Electronics
64 ❑ Financial
16 ❑ Government
07 ❑ Earth resources/oil and gas
19 ❑ Pharmaceutical/chemicals
34 ❑ Publishing
12 ❑ Retail/wholesale
39 ❑ Telecommunications
06 ❑ Transportation
09 ❑ Other_____

My Job Function Is:
28 ❑ Accounting/finance
01 ❑ Administration
27 ❑ Communications
22 ❑ Consulting
10 ❑ Education/training
06 ❑ Engineering
05 ❑ Manufacturing
02 ❑ Marketing/sales
23 ❑ MIS/IR
07 ❑ Operations
12 ❑ Purchasing
24 ❑ Research & development
20 ❑ Software development
00 ❑ Other_____

Please Include A Free World Cup Poster:
01 ❑ Yes 02 ❑ No

Name:_____
Company:_____ Title:_____
Address:_____
City:_____ State:_____ Zip code:_____
Country:_____ Telephone:_____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 11313 BRIDGETON MO

POSTAGE WILL BE PAID BY ADDRESSEE

SUN MICROSYSTEMS, INC.
PO BOX 4491
BRIDGETON, MO 63044-9822

Is funding for information services being transferred from IS to business units?

YES 55%

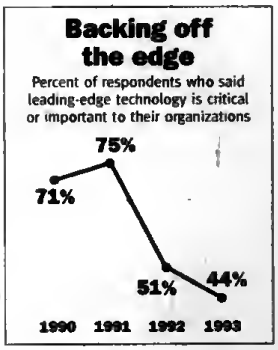
NO 45%

top management and shareholders did drop back somewhat from last year's record high, 67% felt an uptick and fully 95% said they were either getting more attention from those quarters or about the same amount as last year. Because last year was unprecedented in terms of the glare under which IS felt it was operating, that's not exactly a sign of lessening attention.

Equally significant, however, is the fact that more business units are willing and able to take on management of their own information systems if IS isn't up to the task. Lowered central IS budgets aren't all the result of belt-tightening, as is clear from the fact that 55% of the IS executives surveyed reported some funding for information services is now going directly to business units.

Power sharing

Does that mean IS is being cut out of the loop? In some cases, yes. In most cases, no. Much of the transfer of authority and funding is happening at the instigation of IS executives who realize if the imperative is service to internal customers and to the business, their job is less to control than to enable.



Risk aversion

Given the turbulence of today's business environment, the pressing need for new, flexible applications and the integration tasks they already face, IS executives are not much inclined to experiment with untried technologies. Most want to stay well clear of what they refer to as the "bleeding edge." Interest in implementing leading-edge technology has plummeted during the past couple of years. In 1991, 75% of the IS executives at leading companies said it was critical or important. This year, only 44% reported that level of interest.

And that wariness extends not only to gee-whiz gizmos but to seemingly mainstream initiatives such as client/server and open systems. Although IS executives report high interest in both of these, it appears to be a browser's interest. Talk to them about actual implementation and the time frames are either long or vague. For example, 61% have no target date for downsizing the majority of applications and, of those who do, the greatest number see this happening in two to four years.

Customer service

There is a strong indication that IS and other executives are coming together on one concept: Providing the best customer service possible is the No. 1 business priority and therefore the No. 1 IS goal.

Our survey figures pinpoint sales and marketing as the user department receiving the most IS attention and the one that is most likely to be affected by re-engineering efforts. Manufacturing improvements are a second priority, with finance and administrative changes close behind.

All in all, the ride continues to be a rocky one for most IS executives. But there is little likelihood of a dull day. ■

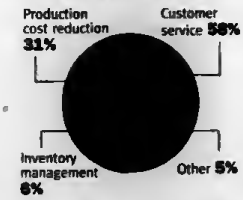
Client/serverizing

Most IS organizations say client/server will be the most critical technology for competitive success in the next five years

Client/server	45%
Open systems	20%
EDI	17%
Object-oriented	13%
Distributed RDBMS	8%
Wireless	8%
LANs	8%
EIS	5%
Imaging	3%
Groupware	3%
GUIs	3%

Attention-grabbers

What is the top business priority that IS supports?



Which user department receives the most IS attention?

Sales and marketing	58%
Manufacturing	27%
Finance/administration	19%
Distribution	13%
Engineering	5%
Research and development	3%
Corporate	3%

(Percent of respondents, multiple responses allowed)

No matter what business you're in or what process you're trying to improve, the basic goal these days is always the same . . .

EXPEDITE!

BY ALICE LAPLANTE



Ethel Dufbaeck uses WILIS to manage overseas stock orders at Becton, Dickinson

TWO YEARS AGO, Ethel Dufbaeck's job was a lot harder than it is today.

Back then, Dufbaeck was struggling to control rising customer complaints, inventory overstocking charges and inflated shipping costs. As inventory controller at Becton, Dickinson & Co.'s European affiliates, it is Dufbaeck's job to make sure overseas representatives of the $2.3 billion medical supplies and diagnostic equipment manufacturer have enough product on hand to meet customer demand. But it was difficult for Dufbaeck, who is based in Meylan, France, to get timely information from the firm's Franklin Lakes, N.J., headquarters. She would call, fax and otherwise scour the distribution chain for clues about when she could expect shipments to arrive at her Belgian distribution center.

"There was the time difference, so I'd wait until late afternoon to call my contacts in the U.S.," Dufbaeck remembers. "They would be busy, or out to lunch or on vacation. When they called back, I'd be busy. Sometimes it took two or three days to connect."

Shipping errors, warehouse delays and foreign customs bureaucracy could easily hold up product deliveries. So, lacking hard information, Dufbaeck often overstocked key items to avoid running out. She would also ask for emergency air delivery — much more expensive than ocean transport — only to find that a critical shipment had already arrived at customs.

That hasn't been necessary for roughly 18 months, however. Now, whenever Dufbaeck is

PHOTOGRAPHY BY ALAIN KELER/MATRIX

concerned about a shipment, she logs on to Becton, Dickinson's on-line Worldwide Inter-Company Logistics Information System (WILIS), which tells her what has been shipped and when she can expect it to arrive. "I even know the container number for each order so that when a shipment arrives at customs, I know how to prioritize unloading activities," she says.



Ken Moore uses a LAN-based system to track the use of Pepsi equipment

Teaming up

WILIS is an example of an information system that U.S. businesses are discovering is virtually indispensable — a system that expedites delivery of products and services by unknotting the communications chain. It is also an example of what can be done when business and technology people put their heads together.

One hallmark of a stellar organization in this final decade of the century is that it no longer treats information technology as separate from the business but as an integral part. As a result, in really effective companies, system ideas are as likely to come from midlevel business managers, factory-line workers and clerks as they are from the information systems staff or top company managers. (For more on how IS organizations are reshaping themselves to accomplish this, see "The reincarnated organization," page 23.)

Tom McDonnell, WILIS project manager and technologist permanently assigned to Becton, Dickinson's International Distribution Services Division, sits in on strategic meetings as a senior member of the division's management team. As a result, he was acutely aware of logistical difficulties faced by Dufbaeck and her counterparts around the world.

Because McDonnell is also a member of the worldwide information technology team that oversees long-term IS goals and architectural directions, he knew the technological time was ripe to pull together some formerly disparate data sources into one on-line system: Roland "Chip" Cyr, vice president of information technology, was spearheading a move to a new global information architecture.

What is effective?
61%
of IS managers view systems management as the initiator of business process change

Whatever works

Convergence of needs and resources doesn't happen as a result of blind luck. Successful IS organizations don't take the chance that a business opportunity might go begging for a technology solution. They make sure savvy business executives not only know who to call when they see something on the horizon, but they also get the resources they need, even if it means reaching outside the company.

That's what happened when Ken Moore, engineering manager at Pepsi-Cola General Bottlers, came up with a scheme to enhance maintenance operations at the Munster, Ind., plant where he worked. Moore brought his idea to Dan Dvorak, vice president of MIS at this $139 million canning and bottling subsidiary of Rolling Meadows, Ill.-based Whitman Corp.

Dvorak realized the economic value of what Moore was proposing — a system to track the use of Pepsi's bottling and canning equipment and automatically notify plant engineers when preventive maintenance should be scheduled, work orders issued or storeroom inventory replenished. The only problem was that Dvorak was engrossed in a systems overhaul in 1992 that meant completely replacing all of Pepsi-Cola General Bottlers' hardware, software and telecommunications infrastructure.

His hands full, Dvorak might have put the project on a waiting list. Instead, he let Moore hire an external systems integrator to install a local-area network-based system in the Munster bot-

PHOTOGRAPHY BY KEVIN HORAN

At effective companies, systems ideas are as likely to come from midlevel managers and line workers as from the IS staff.

tling plant. Word of success spread quickly, Dvorak says, and soon other Pepsi bottling plants began clamoring for the application.

Cost was a big concern when these requests started rolling in. Pepsi didn't have the funds to install PC LANs in each plant. Dvorak was busy switching Pepsi operations from a distributed IBM Application System/400 and System/36 architecture to a Hitachi Data Systems Corp. EX-60 mainframe, converting the separate and incompatible databases supporting Pepsi's 18 plants to a single relational database architecture. Dvorak says he thought the two projects could merge. So he took the functional model of the LAN software already running in Munster, developed a mainframe equivalent and installed it in Pepsi's Chicago plant. Before long, bottling facilities in Texas and Indiana were on the bandwagon.

> Using Ken Moore's systems as a model IS developed a mainframe version for all the plants

"This was a raging bargain from a cost point of view," Dvorak says. The LAN version would have racked up $500,000 in hardware and software expenses atone; the mainframe version — installed across all Pepsi plants — cost less than $100,000.

Technology transfer

If flexibility in providing resources is critical to giving business what it needs, when it needs it (see related story this page), so is creativity in finding ways to piggyback technology projects and exploit knowledge resources.

IS professionals at FMC Corp. are becoming experts at this particular efficiency exercise. FMC is a diversified $3.9 billion firm in the chemical, defense systems and heavy machinery industries. Because the company is highly decentralized, FMC strategic IS development projects are left to its operating divisions; the Dallas-based corporate data processing center acts as a facilitator to ensure that no one reinvents the wheel. (To read about how another company, The Hartford, handles this kind of coordination, see "The great platform leap," next page.)

Tinish Mehta did not intend to become a corporate resource when he decided to tackle a little process redesign in 1990, but that's exactly what he's become, thanks to the social networking skills of FMC's data center staff.

A manager in the finance department at FMC's $800 million Ground Systems Division in San Jose, Calif., Mehta put together a focus team in 1990 to study how the accounts payable function could be streamlined. He subsequently oversaw development of a client/server imaging system from FileNet Corp. that links to FMC's IMS accounts payable database in Dallas and automates the validation and payment of vendor invoices.

"This was an eye-opening experience," says Mehta, who acknowledges the project hit a number of snags, although he considers it a success.

To ensure that this experience — good and bad — didn't go to waste, Joe Dworak, a senior business analyst at FMC's corporate data center in Dallas, was brought into the loop. When Dworak heard that one of FMC's chemicals groups was also investigating imaging, he arranged for a "knowledge transfer" between that site and Mehta's group. "We're making sure that everything we learned about the hidden expenses and technological hurdles is passed along."

Although there is no rule that says divisions should consult the central IS staff on initiatives, Dworak says they are doing so more often. The reason? "They're finding that we're helpful at locating and leveraging the pockets of existing technology knowledge." ■

— Alice LaPlante is a free-lance writer in Palo Alto, Calif.

THE DRAFT PICK OPTION

HELPING BUSINESS units deal with emerging business situations often means giving them the firepower to do much of the work themselves.

In 1987, US West, Inc.'s Controller and Vice President of Finance Jim Helwig started looking for IS help. The 1984 divestiture of AT&T had left US West as the parent company of three Baby Bells: Mountain Bell, Northwest Bell and Pacific Northwest Bell. Helwig said he felt it was inevitable that these three entities merge operations and, when that happened, technology would play a key role in reconciling and optimizing financial functions.

In 1990, when US West consolidated its regional Bell operating companies, Helwig had a three-year head start. He made Judy Dimino, a technologist from US West's centralized IS group, part of his permanent staff, giving her a department of 70 certified public accountants and financial analysts to create requirements for a merged and improved financial system — Profit (Professional Financial Information Tools).

Dimino has a close working relationship with US West's IS department and with R. B. (Bob) West, US West's director of corporate systems, who provides her with programmers and technical consultants to code Profit applications.

The payoff? The $33 million Helwig has spent thus far has been funded by operational savings from the incremental rollout of Profit, which will be completed in 1995.

THE great PLATFORM leap



BY ALAN RADDING

If changing architectures have you and your staff ready to jump off the nearest high structure, you're not alone. *Premier 100* information systems departments wrestle with the same daunting array of unknowns: relational databases, graphical user interfaces (GUI), legacy data, telecommunications and a confusing array of technologies. Many of them have discovered, however, that it's a lot easier to preserve sanity and steer clear of architectural disaster if you employ that time-honored safety technique known as the buddy system.

Buddies can take many forms. IS managers at some of these companies say the best course for them is to concentrate on design and planning. When it comes to implementation, they step back and leave the shirtsleeves work to their buddies — the vendors and integrators.

In other cases, the designated buddies are actually corporate technologists or IS managers from other areas of the company who share what they've learned on their own projects to keep their colleagues from stubbing their toes in the same places or investing time researching what's already known. And last but not least, there is the business-buddy option. Some companies are instituting a joint development process that pairs IS and business personnel in project teams, where development becomes everyone's primary job until an appropriate system is delivered.

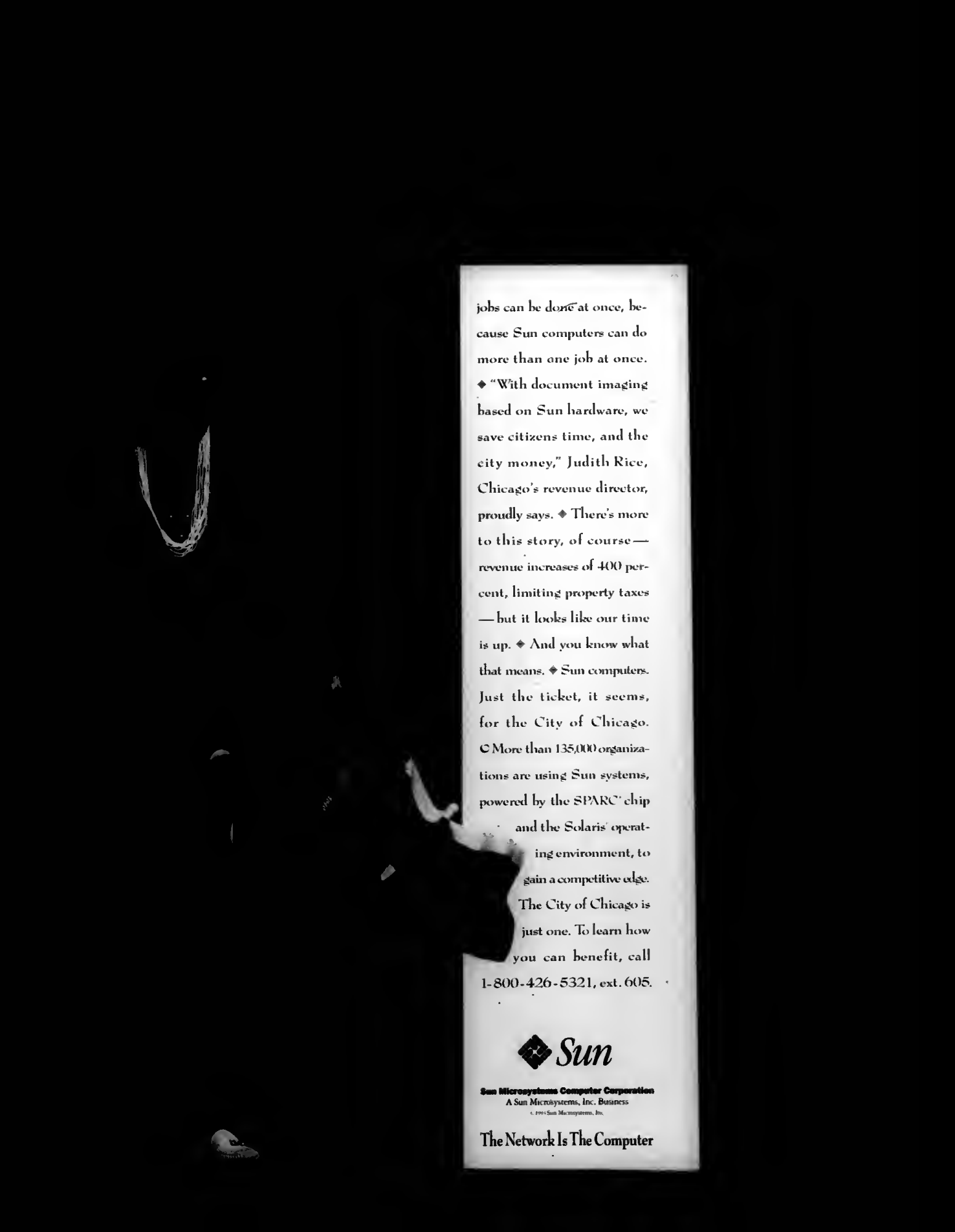
Warner Schlais, director of planning and technology at UAL Corp. in Chicago, is an advocate of the first option. "Using the vendors and integrators minimizes the risk," he says. Of course, this isn't a labor-free solution, As Schlais explains, laying the groundwork for the contractor re-

Continued on page 16

ILLUSTRATION BY WARREN GEBERT

HOW A NEW TYPE OF COMPUTER PUT A STOP TO ONE OF CHICAGO'S FAVORITE SPORTS.

Even now, Chicago's scofflaws recall the sport warmly. ◆ You took a parking ticket. Folded it. Crumpled it. Then, simply booted it away. ◆ Thirteen thousand parking tickets written each day. Maybe, on a charitable day, 10 percent paid. ◆ But if you're thinking of playing that game these days, officials have one word of advice: Don't. ◆ Sun computers have been installed. And they are very, very effective. ◆ Claim the meter was broken, and a Hearing Officer will check a "meter database" on a Sun computer. Protest the ticket isn't yours, and a scanned image of the original is pulled from a database. Yell that you're in a hurry, and all these



jobs can be done at once, because Sun computers can do more than one job at once. ◆ "With document imaging based on Sun hardware, we save citizens time, and the city money," Judith Rice, Chicago's revenue director, proudly says. ◆ There's more to this story, of course — revenue increases of 400 percent, limiting property taxes — but it looks like our time is up. ◆ And you know what that means. ◆ Sun computers. Just the ticket, it seems, for the City of Chicago. ◆ More than 135,000 organizations are using Sun systems, powered by the SPARC® chip and the Solaris® operating environment, to gain a competitive edge. The City of Chicago is just one. To learn how you can benefit, call 1-800-426-5321, ext. 605.

Sun

Sun Microsystems Computer Corporation
A Sun Microsystems, Inc. Business
© 1994 Sun Microsystems, Inc.

The Network Is The Computer

Continued from page 13

quires spelling out your requirements in painstaking detail. By the time his group at UAL pulled together its technical specifications and end-user definitions of required functionality, it had produced something close to the heft of a prolific author's collected works. The specification document for a client/server-based systems maintenance application, for instance, exceeded 100 pages.

That particular application was designed to give maintenance controllers faster and better-coordinated access to flight information and reports from pilots and ground crews.

Project manager Sandy Kingery says UAL couldn't have implemented the application alone. Combining Unix systems equipped with the Open Software Foundation's Motif as well as Sybase, inc., IBM and Unisys Corp. mainframes and Integrated Services Digital Network (ISDN) voice and data services would have been overwhelming without outside assistance. But the experience also made clear the importance of knowing what you want and sticking to it.

The design called for the use of ISDN, which would let developers give the controllers the ability to screen voice and data messages according to defined priorities. "We wanted an open systems interface to the ISDN Basic Rate telephone switch, hut AT&T [the integrator] wanted to use its proprietary interface," Schlais recalls. The developers made it clear that if AT&T wanted the joh, it would have to modify its interface to comply with their requirements.

61% of IS managers do not have a target date for downsizing most of their applications...

...and **26%** of those who do have a target date say it will happen in two to five years

Since beginning its move toward a three-tiered architecture and distrihuted systems three years ago, Northrop Corp. has also discovered that vendor partnerships can ease the transition to new architectures and help keep overhead low. "There is no way we can keep up with technology by trying to do it all internally. We have to partner," says Herbert Anderson, vice president and general manager at the Northrop Information Services Center in Pico Rivera, Calif.

But Anderson says he expects true partnerships, not the usual vendor/customer relationship under a fancy name. "We're not just hiring subcontractors; we are creating an entire arrangement where we will share costs and share opportunities," he says.

For example, Northrop recently hired a vendor to write a system that other aerospace contractors may also want. Northrop developed the specifications and hrought the husiness knowledge, while the vendor partner wrote the code. As part of the deal, Northrop insisted on a share of any future sales of the system.

At The Travelers, risk minimization is also accomplished through sharing, hut on a strictly internal basis. What the company has done is create central pools of expertise that can help to

The Travelers' Ellen Rasmussen talks IS managers through the hard questions surrounding client/server conversion



PHOTOGRAPHY BY MAX AGUILERA-HELLWEG

transfer hard-won technology lessons across organizational boundaries. Ellen Rasmussen, who holds the title of technical director/client/server architect at the Hartford, Conn.-based life insurance company, might also be considered chief lifeguard/preventer of avoidable injuries.

First things first

In Rasmussen's estimation, the biggest mistake people make when they tackle client/server computing is to start with a tool and then try to bend business requirements to the capabilities of that tool. Her job, she says, is to make sure system development projects at the company take the reverse approach.

She does this, she says, by asking the whys and what-ifs, literally talking unit IS managers through an analytical process. This technique of constructive probing has now been formalized and institutionalized in a process called Technical Information Developer Support (TIDS, pronounced "tides") that puts Travelers' collective development experience at the fingertips of IS managers in individual business departments.

The way TIDS works is that all system design proposals for business units are submitted for review by a committee of Travelers' most experienced technologists, who discuss the goals and methods and offer suggestions for improvement.

The ultimate decision on how to proceed lies with the business unit, Rasmussen says, hut the TIDS committee delivers a formal written report that stands as damning testimony if someone ignores its input and plunges headlong into a disaster.

Robert Tofil, IS director for Travelers' personal lines technology, brought the designs for a client/server-based counselor's workstation system to the TIDS committee. This system would replace a mainframe terminal used by customer service "reportentatives" (counselors) to find answers to customer questions, greatly expanding the amount of information availahle and the speed of access, as well as the variety of possible queries.

Tofil's design passed muster, but the committee questioned his implementation plan and recommended he put some client/server expertise on his team. Tofil subsequently engaged a Travelers technology transfer specialist suggested by the committee for 10 months to bring his people up to speed on database access, GUI technologies such as Easel Corp.'s Easel and OS/2.

Tofil says he likes the TIDS process because it provides an extra measure of comfort. "TIDS helps us avoid doing something stupid," such as venturing into client/server development without an experienced person on the team, he concludes.

At Carolina Power and Light Corp. (CPL) in Raleigh, N.C., the preferred method of avoiding missteps on ambitious architectural restructuring projects is through formal teaming of technical and nntechnical personnel on the system development teams. Every project is sponsored by a top corporate officer and carried out by co-managers, one from IS and one from the husiness unit. These teams work together, elbow to elbow, for the duration nf a project, which may be several years.

This technique, which CPL's Chief Information Officer R. Thomas Dwyer says helps to ensure that emphasis is placed on process re-engineering rather than technology, recently carried the company though a massive re-architecting of its 20-year-old eustomer information management (CIM) system.

The CIM project, which began in t988 and culminated in December of last year, involved transferring a reworked version of the customer service system from a strictly mainframe environment to local-area network-based PCs running a mixture of batch and on-line transactions accessing a DB2 on the mainframe. The first step, however, was identifying 250 customer service subprocesses as candidates for re-engineering.

Bruce Anderson, manager of systems development and support and co-project manager, says there is no question that having husiness users as part of the team exerted a strong influence nn the design.

Left to their own devices, Anderson says, developers would have given priority to the most complex transactions, such as a meter cut-off, but business representatives insisted the team concentrate on activities that take place while customers are on the phone with service representatives. "This meant that a billing question gets a higher performance priority than some more complex back-office task," he says. ■

— Alan Radding is a free-lance writer in Newton, Mass.

Power teams: CPL's Thomas Dwyer (left) and business partner Norris Edge tackle CIM re-architecting



PHOTOGRAPHY BY SIMON GRIFFITHS

Behind every great CIO . . .

CEOs talk technology and tactics

By Michael Sullivan-Trainor

Satisfy your users first, count your transactions second. That's the message for information systems executives who want to garner the highest performance ratings from their company's chief executives.

This year, the *Premier 100* added a chief executive criteria, in which CEOs, CFOs and COOs were asked to rate their IS department. Those executives who gave their IS organizations the highest ratings in the satisfaction survey were unanimous in placing happy users as the top priority for IS.

"The key to measuring IS performance is determining whether or not the IS organization is allowing its users to do what they need to do," says AMR Corp.'s CEO, Robert Crandall. "We want a larger percentage of industry revenue, and we can't get it unless IS provides its users with the right tools."

Crandall was among the 26% of chief executives who rated their IS organization as very good, the highest rating. The majority of top bosses, 58%, said their IS groups were good. Another 16% rated them average.



AMR's Robert Crandall: 'IS has got to change itself and be the educational arm within the company'

PHOTOGRAPHY BY REID HORN

How they measure

"Although we place a high value on the contribution of IS, we do not use specific performance measures to gauge its effectiveness," says Gencorp, Inc. CEO A. William Reynolds. "Rather, we measure the effectiveness of IS by the degree to which it supports the strategic plans of our business units. This support is the single greatest benefit provided by IS."

These executives collect their performance information both formally through meetings and user surveys and informally through chats with key users and IS personnel.

"If we're not happy with a part of information systems, it doesn't take me very long to find out," Crandall says.

Tight business ties

A whopping 64% of chief executives say IS is very closely linked to their business strategies. Another 34% say it is somewhat linked, and 2% say it's not very linked.

Even more significant is the fact that 94% of them say the role of technology is increasing.

"Information systems is one of our most important tools in assisting the firm to manage risk for ourselves and our clients," says Charles Sanford, CEO at Bankers Trust New York Corp.

"We couldn't run the company



Gencorp CEO A. William Reynolds measures IS based on how well it supports the strategic plan

without it," says Miles L. Marsh, CEO of Pet, Inc. "We need the ability to manipulate timely and accurate data about our business. Without information technology, we couldn't get the information we need."

Motivating CIOs

How do the most satisfied chief executives motivate their top IS executives? "Scare the crap out of them," Crandall says.

Seriously, Crandall spurs his top IS executives to action the same way he does other business executives. "Make sure everyone has a clear understanding of what the company as a whole faces. Give them world-class tools to work with. Expect them to be a leader in all the elements of their jobs. Ultimately you want them to motivate themselves," he says.

How IS executives are viewed by their bosses also plays a significant role in their motivation. "Involvement on the strategic planning process and support of the plan is also a major source of motivation to IS executives," Reynolds says.

"The information resources executives participate in the normal executive compensation arrangements. That's the hard side of the issue. On the soft side, our management is very inclusive, and information resources are viewed as an important part of senior management," Marsh says.

IS accomplishments

The benefits of IS are too numerous to count, many chief executives say. "Competitive superiority. You have to have a world-class IS operation as a key building block in the pyramid of a world-class airline," Crandall says.

The chief executives also named recent IS projects that contributed to their favorable views:

"We're changing from conventional systems development practices to development methods on PC platforms using client/server technology," says Albertson's, Inc. CEO Gary Michael. "The ability to develop easy-to-use systems in a short time is a paramount requirement for our corporation."

"Our information services is modifying the organization and skill set to keep up with all of the technology, which is constantly changing," Crandall says. "As user organizations handle more and more of the information technology issues, IS has got to change itself and be the educational arm within the company."

"We are supporting the 'Efficient Consumer Response' program within our industry. A number of our initiatives are directed at developing a closing link between the information systems of manufacturers and retailers to reduce inventory and cost," Marsh says.

Among the future technologies that chief executives see as important in the next five years are the following:

- **"Scanner technologies in the retail, warehouse, manufacturing and distribution areas. These allow us to track detailed information about our business store by store. Access to this information is changing the way marketing is done in this business."**

—Miles L. Marsh

- **"Massively parallel processors, workstations and graphics/information displays are the most important future technologies."**

— Robert L. Keiser, COO, Oryx Energy Co.

- **"We feel open systems and networks will provide the framework for the information infrastructure that will allow Albertson's management to have timely information about all aspects of our business and be able to react accordingly."**

—Gary Michael

- **"All of the technologies are blending together so that they are becoming indistinguishable. Integrating them is one of the greatest future challenges."**

—Robert Crandall ■

. . . is a savvy chief executive

PHOTOGRAPHY BY JACK VAN ANTWERP

INTERVIEW

'I'm The Guy Who Leads The Cheers'

BY JOYCE CHUTCHIAN-FERRANTI

Helene Curtis' CEO Ronald Gidwitz

RONALD GIDWITZ *is somewhat of a youngster among CEOs. That, he says, may have something to do with how he relates to information technology. So may the fact that he briefly worked as a Fortran programmer one summer between college years. Now, standing on the sidelines of information systems at Helene Curtis Industries, Inc., the $1.1 billion personal care products company, Gidwitz looks at IS as being the right arm to the business. Senior editor Joyce Chutchian-Ferranti spoke with Gidwitz about how he sees the impact of information technology in supporting business goals.*

How important is information technology to your company? Very important. The collection, dissemination and analysis of information can make a real difference in how we run our business. We spend a lot of time thinking about what we do and how we use our information and how we can do that better and more effectively.

How involved are you in IS decisions? I'm a great cheerleader. I'm the guy standing on the sidelines rooting for the players. I'm not involved with the intricacies of each system as it is going in, but I certainly am interested in how well we take advantage of the investments we make in systems.

What do you see as the proper role of the chief information officer? I think that if I'm a cheerleader, the CIO is the quarterback/playing coach. That's the guy who formulates the strategy, gets consensus and makes sure the execution is flawless.

As a chief executive, how do you communicate with IS executives? We communicate directly. I don't oversee things directly, but I look over their shoulder a lot. I'm involved in the strategic planning aspect. I review those plans and the annual operating plans.

Do you think having a knowledge of what systems can accomplish is the norm for CEOs? It's not the case now, but I think eventually it will be. There's clearly a generational difference between older executives and younger executives. Those who graduated from business school in the last 5 to 10 years and don't get a PC think they are being deprived of a piece of equipment that is going to make them effective.

On the other hand, you have executives who don't realize they can overcome the inability to use it. I'd like to think it's because I'm of the next generation of managers, which has some familiarity with this kind of technology. We didn't have computers when I was in school, but I did develop some programming skills in engineering school.

Where do you think most CEOs are in terms of technology? Most CEOs are somewhat older than I am and therefore are in many instances not regular consumers of data directly off the device. They get the information, but they get it through third parties.

Do you view IS as a support function or as a driver of the business? I don't believe it's a support function. They aren't directly involved in things like making calls on customers, but the systems are so integral to what we do that people couldn't live without them. We are looking to IS to help us develop our competitive edge to as fine a point as we can.

You've said that conditions are difficult in your markets; that you haven't, for example, seen a price increase for five years. Can IS make it easier to com-



pete and stay profitable in an adverse climate? There's not a whole lot of direct impact, hut there are a number of ways technology has had an indirect impact. We've used IS to help us reduce our costs in a wide variety of areas, from distrihution to order entry and our manufacturing processes. We've used them to help us do a more thorough joh in our research area. Plus technology is a tremendous communications vehicle for our worldwide operations.

Can you think of a specific example of how information technology is supporting expansion, differentiation or any other important business goals for your company? It allows us to take marketing and sales data and translate it into information from which we can make real-time marketing decisions. By tbe same token, we can put that same information about our customers to work in our manufacturing plant and not have to guess at what the requirements are going to be for our factory.

How do you measure the effectiveness of your investments in information technology? Information is integral to everything we do. It's a process within a whole host of other husiness processes that enhance our business. We measure how good we are in terms of market share, sales growth and profitability.

What's the best thing that technology has done for you lately? It has made me far more mohile. I can be any place in the world now and it's almost the same as being in my office. I carry a laptop equipped with a fax board, and I can dial into facilities at the Chicago office and no longer be bound to the office. Also, although we're not quite there yet, we're seeing the creation of one virtual worldwide office.

You don't need to be all together to be able to interact well. We're nsing a variety of technologies. And that has enormous potential to be ahle to improve the effectiveness of how people work together.

How knowledgeable are you personally about computer systems? When I come into my office each morning, the first thing I do is turn on my machine. And then I get my coffee. I was a frustrated engineer when I was in school; I ended up being an economics major. I had programmed in Fortran, and for one of my summer jobs, I worked for an MIS department, so I feel quite comfortable with It.

Have computers improved the quality of planning and decision-makiag at the corporate level? Yes, hut I would have said that 10 years ago. I think since then we've been incrementally honing our skills in those areas, and clearly, technology has helped us do that. But what strikes me particularly is the ability to be so much more productive. Information technology is helping us push aside all of the nonessential parts of what we do.

How has IS changed in the last few years? It hasn't changed all that much. It is an integral part of what we do. Asking how it has changed is like asking, "Has your right arm changed today?" It is just a part of us. ■

RONALD GIDWITZ: "We look at investments in information technology as investments in a tool for success"

PHOTOGRAPHY BY MICHAEL ABRAMSON

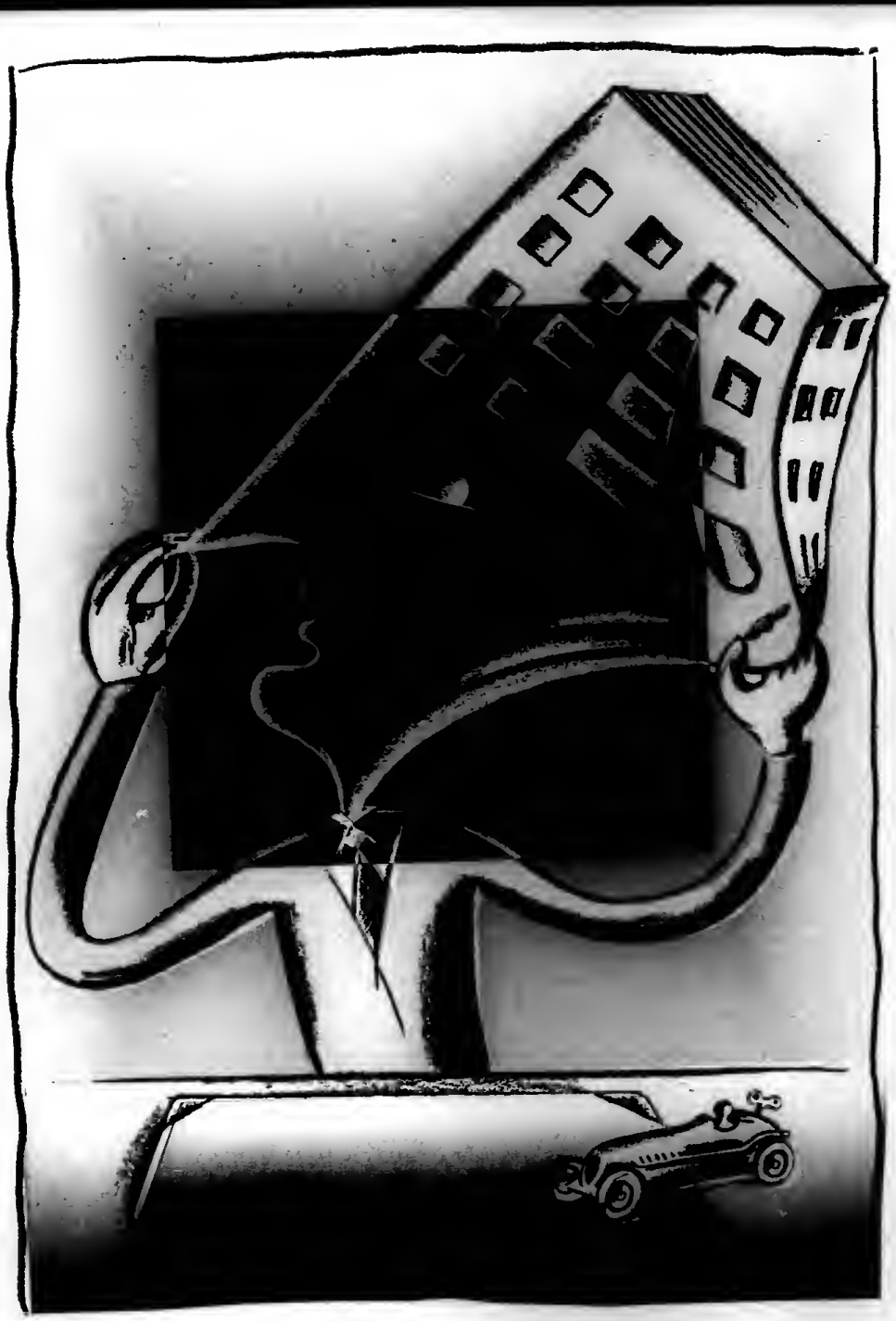


ILLUSTRATION BY FRANK VIVA

THE

REINCARNATED ORGANIZATION

Information services are changing shape and taking on new personalities

BY

Joanne Kelleher

When the world around you changes, you had better change, too. And that's exactly what effective information systems organizations are doing these days: Rapidly, and often radically, they are transforming themselves.

This isn't a matter of decentralization or recentralization. It isn't that simple.

Wal-Mart Stores, Inc. tried decentralization and a lot of other things in the past, says Bob Martin, executive vice president. All produced some benefits at the time, hut none were sufficient by today's standards of what an IS organization must be and what it should do. That's why Wal-Mart decided to hreak the mold and start fresh with a structure predicated on something more fluid and dynamic than support of individual husiness functions.

The result? An information services staff largely composed of teams organized around strategic business goals that the company's executive committee identified. These goals are almost always broad-based, involving process and application changes in a variety of husiness functions. And as specific targets are achieved and new priorities emerge, teams disband and reform.

Anticipating support

This structure, Martin says, is flexible and much more compatihle with the way husinesses must operate now compared with the old functionally defined, react-mode model. "I've always taken the position that if users develop requirements and *then* come to IS, you're already behind."

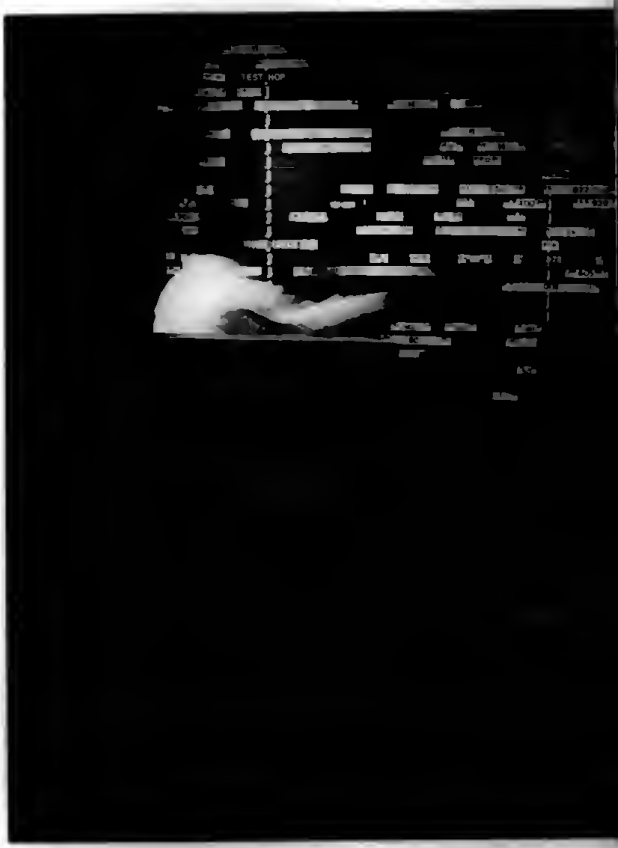
Dennis Jones, vice president and chief information officer at Federal Express Corp., says that when a company or department is in that situation, it is "behind the power curve." And that's not a place he wants his department to be. "One of the chronic complaints you hear about the information technology function is that it is slow and unresponsive," Jones says, "and I believe the reason for that is the tradition that says you wait for the user to come to you."

At Fedex, that is definitely not the current operating model.

Although the reporting structure remains centralized, and the entire information technology staff marches to the same "guiding principles," most of the information technology staff members now park their computers in user areas. Several scores of them share office space with sales personnel and go along on calls to serve as technical advisers to customers interested in the options for system-to-system information exchange.

At this point, almost half of the company's package-handling volume is processed either through Fedex-developed desktop systems at customer sites or customized electronic data interchange connections.

Fedex aircraft control personnel are able to get planes landed, unloaded and back in the air faster with a new graphics-based system



All told, about 90% of the information technology staff is now considered part of the internal customer base, Jones says, with the remainder serving as suppliers of support services. It's a structure that has been evolving for some time, according to Jones, but it has really come together in the past couple of years.

At Duke Power Co., change has been more abrupt and, in some ways, more radical. Jimmy Hicks acquired his title, vice president of information technology services (ITS), a little more than eight months ago, after participating in a study evaluating how information technology was delivered and used at the company.

When he became involved with the evaluation of IS, Hicks was a customer — vice president at Power Delivery — and that customer perspective is something he is trying hard to retain and embed in the working processes of his new department.

Since his arrival, the top priority for the ITS department has been to figure out how to live up to its new name (it was formerly called the IS department) and create mechanisms to ensure that its operating agenda directly reflects business strategy.

Business users have played a lead role in the change process. Managers from various areas of the company were drafted to work full-time for four months with the ITS staff, determining how things should work and what it would take to make these new processes practical.

A number of major alterations in service delivery are under way as a result of this group think effort. Already, more than half of the technology service providers have been shifted from the ITS organization into business departments.

Off the bucket brigade

For both groups, job terrain is changing as radically as surroundings. Using remote management and troubleshooting systems, Hicks says he hopes to take most of the firefighting out of support jobs, freeing time for problem prevention and system enhancement. "Right now, these people are spending 80% of their time putting out fires and 20% doing things that add value to the business," Hicks says. "We want to switch that around."

Top staffing shifts

Premier 100 companies are implementing the following types of staff structures:

1. **Self-directed work teams**
2. **Staff in business units**
3. **Fewer programmers, more business analysts**

Application developers are learning to operate in a more modular and interactive mode. "We used to deliver major applications in big chunks," Hicks says. "We'd take on the world and spend three years designing and building a system. By the time it was delivered, the world had changed."

Not all the reforms entailed changes to the technology services function. Users had to mend some of their ways. In particular, they had to face the fact that diversity is not a desirable trait in systems.

"Getting the users to come up with single standards for desktop applications, network operating systems and network protocols was a struggle," Hicks says. "But they did it, and it is going to make a great difference."

Establishing standards and creating structures that help to ensure

PHOTOGRAPHY BY JACK KENNER



priority agreement between users and IS are recurring themes.

Recombining the elements

Phelps Dodge Corp. moved to head off problems with incompatible desktop systems and LANs a couple of years ago, moving the PC group into the domain of the telcommunications manager.

"A lot of the hidden cost of computing is PC support," explains Dudley A. "Mac" McRea, director of corporate IS. "And with more and more local-area networking, it is even more critical to make sure that, no matter what we do, everything is compatible and works everywhere."

The blending of skills and experience is also a theme in software development, where the company has created a software engineering group to work on client/server projects and provide a model of how such projects should be approached. It is no accident, McRae says, that the project manager was a mainframe database administrator.



"By bringing mainframe experience to this, we'll be addressing a lot of the big concerns about client/server — things like security and change management."

At Harley-Davidson, Inc., the primary vehicle for change is a companywide initiative called the Performance Effectiveness Process, which requires employees to evaluate their activities on a quarterly basis and draw up detailed commitments for upcoming work.

Goals and priorities are established not in isolation but in the context of teams made up of "stakeholders." In the case of IS, this means business users and suppliers of equipment and services, whether internal or external. No commitment is made unless all of the parties involved sign off on the goals and the specific targets by which progress will be measured.

The benefits of this approach are substantial, according to Rich Kolbe, IS director at Harley-Davidson. The process forces employees to analyze how and to what effect they are spending their time.

Randy Mott, vice president of the information services division at Wal-Mart, also counts a broadening of vision among the major benefits of his company's reshaping of IS.

"You get a cross-business focus as opposed to strictly departmental initiatives," he says of Wal-Mart's strategy teams approach. This offers the potential for more substantial and far-reaching improvements — not only because you work on business processes end to end but also because breaking down barriers between parts of the business helps dissolve walls between technical specialties.

In the past, Mott says, business requirements were too often forced to fit into existing technical niches. People would automatically grab for whatever they knew. Now that everyone has a broader frame of reference, they are less likely to default to narrow prescriptions.

Like Harley-Davidson, Wal-Mart is increasing the amount of individual responsibility. In the past, development managers at the company might have managed eight to 12 people, Mott says. Now, as "strategy managers," these same individuals might oversee twice as many. That, of course, gives each team member more influence, self-determination and responsibility.

Adjusting to new ways of thinking and operating isn't quick and easy. As Kolbe stresses, when you change organizational structure or job processes, you alter the dynamics of the workplace. "People feel more accountable, but they also feel more vulnerable ... outside their element of control. You can't change that in a day," he notes. ■

SMART RATIONING

When the budget is scarce, innovation is plentiful

BY JULIA KING

DOING MORE WITH LESS is as much a mantra at top-performing information systems organizations as anywhere else. *Premier 100* companies are not exempt from the current cost squeeze, but they approach this problem, as they do others, with a high-energy mix of "can-doism" and inventiveness.

At Engelhard Corp., a $2.5 billion specialty chemical manufacturer in Iselin, N.J., several years of aggressive cost-containment efforts, which resulted in successive budget declines, have made Stephen Pook, vice president of quality business design and information services, something of an expert in fat reduction. As his title suggests, however, there is more going on at Engelhard than simple belt-tightening.

Pook, who heads up a companywide re-engineering effort, is applying to the IS organization lessons in process change and quality improvement learned in other parts of the company.

For example, Pook is a strong advocate of regular price/performance benchmarking: Internal operations are regularly compared against outside providers, and anything that can't be done better and/or more economically in-house is outsourced.

PC support is now handled by an external provider. Engelhard closed down its data center and moved its IBM mainframes to facilities owned by Paine Webber, Inc. in nearby Secaucus, N.J.

33% of the Premier 100 have had staff cutbacks this year.

Any IS organization that's concerned about dollar efficiency ought to be regularly evaluating outside options, Pook says. "We need to think about IS not as a kingdom over which we have control but as a data processing utility. And, as the caretaker of that utility, we need to look for the most cost-effective way of delivering services."

In staffers' hands

What's particularly notable here is not so much that philosophy but that it has been communicated to and is carried out by teams of IS staff members who are given responsibility for improving the cost-effectiveness of particular processes. Sometimes these teams recommend outsourcing; sometimes they find other ways of gaining efficiencies — reassessing vendor contracts and vendor relationships, for example.

The process orientation is key, according to Pook, because it gives an entirely different view of the way things are accomplished from what can be achieved with conventional function-based thinking. Similar efforts throughout Engelhard are expected to yield between $60 million and $80 million during the next three years.

Not all *Premier 100* IS departments faced



with tight budgets go through the kind of extensive internal reorientation that Engelhard has gone through. Many, however, are looking hard at data centers as an area of overinvestment. Several have shut down satellite data centers, reducing real estate, hardware and personnel costs by concentrating their processing in large-scale — and often heavily automated — central sites.

45%
face budget pressures

One facility the goal

Dallas-based JC Penney Co. closed four data centers in 1989 and will close another three this year to operate one central "lights out" facility by the end of the year. As of July 1, scheduling and change control functions had been shifted to the central facility; monitoring and operations functions were slated to move over Aug. 1.

"So far, this has all been transparent to our store and catalog operations," says Jim Blanton, manager on the consolidation project.

Walt Tempe, manager of financial information services at Unocal Corp.'s Sugar Land, Texas, office, uses the same adjective to describe the shift of his processing from a local mainframe-equipped data center to a remote supercomputer site in La Brea, Calif. The changeover has been absolutely transparent, he says. "Our response time is just like we were still sitting next to the mainframe."

Thanks to an overall decline in the price of high-speed T1 links, this $10 billion Los Angeles-based petroleum and geothermal energy company has been able to close four IBM 3090-class data centers since 1986 and use multiple T1 facilities to tie all of its offices, including a computing-intensive geothermal and seismic research group in Houston, to that single, highly automated facility in California.

Unocal's Paul Jones saved millions by consolidating telecommunications service

Slice of the pie

But outsourcing and data center closings are only part of the picture. IS managers who are under pressure to do more with less are also rethinking old truisms about how to invest in equipment.

"One of our biggest headset changes is to view technology as a commodity and consider what is cheapest and best, rather than just buying from IBM," says Robert M. Menar, senior vice president of information services at Los Angeles-based Carter Hawley Hale Stores, Inc. A stint in Chapter 11 bankruptcy that ended in 1992 has given the retail chain a hard-nosed attitude about spending.

Between 1991 and 1992, Menar says, Carter

PHOTOGRAPHY BY ALAN LEVENSON

Hawley pocketed almost $7 million hy swapping out 150 million instructions per second of IBM processing power and leasing used computer equipment from a third-party provider. The used equipment, he says, got the joh done just as well as the IBM gear for which the company had been paying top dollar.

Like Carter Hawley, JC Penney also takes a commodity approach to acquiring information technology. Now all systems and software huys, including those that once went automatically to IBM, are put out to hid.

"What it amounts to is that we're huying better than we ever did," says Dave Evans, IS vice president at the $19 hillion retail and catalog giant. Evans says savings typically range from 20% to 40%, depending on the type of equipment involved.

Buyer beware

"Try before you huy" are Evans' words of caution for other managers interested in following a similar course. "Generally, we set ourselves up five or six months ahead of time to test the equipment we're interested in huying," he says.

Despite the retailer's aggressive cost-cutting, "we don't feel we've made any sacrifices," Evans says. "Instead, we feel we've become significantly more efficient in the way we deliver computing services."

Today, for example, nearly all of the retailer's 3,000 suppliers conduct husiness with the company electronically, with 93% of purchase orders and 75% of invoices processed via electronic data interchange.

Switching gears

At Unocal, where the IS hudget decreased hy 20% in 1993, the quest for purchasing efficiency has led the company in a different direction. Instead of working with a greater number of suppliers, Unocal is actually consolidating its contracts and seeking volume discounts.

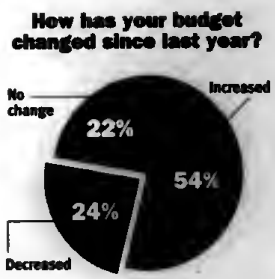
By throwing all of its voice and data network transmission husiness to MCI Communications Corp., for example, the company has cut communications and computing coste hy "several million" dollars, according to IS direćtor Paul Jones.

Previously, the company divided its telecommunications purchases among the Top 3 carriers.

Other cost-cutting measures at Unocal include huying PCs and terminals outright, instead of leasing, to eliminate recurring costs; relieving the 400-person IS department of PC purchasing and installation functione, turning these back over to the company's central purchasing department; and "basically, listening to users and not doing what they don't want," Jones says. "A lot of times, we would print out a 3½-in. document, and all that the user needed was two numbers."



Engelhard's Stephen Pook regularly compares internal operations against outside providers to identify possible efficiencies



Economies don't always have to come in the form of large, sweeping changee. At Engelhard, a decision made a few years ago to forego an expensive, discretionary upgrade of the company'e IBM mainframes has saved several million dollars and cost nothing in terms of effioiency, according to Pook.

And Jones notes that a lot of the cost-cutting ideas implemented at his company were in the $10,000-and-under category. "But," Jones says, "if you get a thousand $2,000 ideas, you've got $2 million in savings. It'e amazing how it adds up." ■

— Julia King is a free-lance technology writer in Ridley Park, Pa.

PHOTOGRAPHY BY MAX AGUILIERA-HELLWEG

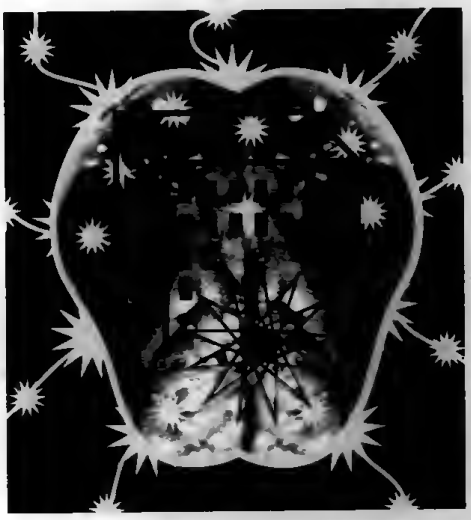
YOU HAVE A MORE THAN ADEQUATE SUPPLY OF GOOD, TALENTED PROGRAMMERS, ANALYSTS AND SUPPORT STAFFERS. TROUBLE IS, THEY'RE WIRED FOR PLATFORMS, OPERATING SYSTEMS AND WAYS OF WORKING THAT DON'T MEET YOUR CURRENT REQUIREMENTS.

BRAIN STRAIN

BY DAVID BAUM

YOU MAY NOT WANT TO HEAR THIS, but devising a technology strategy is the easy part. Where things really get tough, says Ron Sonnenburg, director of information services at Deere & Co. in Moline, Ill., is in translating vision into reality.

What makes this so hard, not only at Deere but at most places, is the need to bring staffs up to speed quickly on technologies that are often radically different from anything they've encountered before. At Deere, for example, Sonnenburg's 1,500-plus systems people are experts in Cobol and IMS, twin bastions of aging mainframe systems everywhere. He wants to move his staff toward client/server, but making that transition is a little like trying to leap onto a moving train while juggling with one hand.



"We've got to keep the old systems alive while making the transition to the new, which is changing all the time," Sonnenburg says. And as if that's not enough, he adds, they have to do it without an increase in staff.

Skill reorientation is a problem most technically ambitious companies are facing. Stuart Woodring, an analyst at Forrester Research, Inc. in Cambridge, Mass., says a good number of Fortune 100 companies are floundering at retraining their systems staffs.

Balancing act

Lack of money is part of the problem, Woodring says, but there are other factors.

One is a reluctance to invest heavily in technical education until the current rate of change abates, he says. What if you spend a lot of money to train your whole staff in the wrong technology? Better to wait and make do than make a mistake of that magnitude.

It's a delicate balance, says Jimmy Hicks, vice president of information services at Duke Power Co. in Charlotte, N.C. "You need to constantly reassess just what the cutting edge is," he explains. "I try to see where the market is going before investing a lot of resources in a new solution. And that goes for training as well."

A gradual, test-the-waters approach can become crippling if it's too gradual, but Hicks says he believes some areas are more dangerous than others. "Object-oriented programming, for example, gets a lot of press, but all the vendors are start-up companies," he says.

Then there is the issue Sonnenburg mentioned: the maintenance requirements of old programs, which tie up existing information systems resources and make it extremely difficult to systematically expose and educate staff to newer technologies.

But Deere hopes to escape this dilemma. The company is serious about staff education, devoting 8% of its total systems budget to training — about twice the industry average. At the Lawn and Grounds Care Division in Horicon, Wis., for example, laying a careful foundation for client/server is a

Continued on page 34

ILLUSTRATION BY JOHN HERSEY

WORLD CUP SOCCER COMES TO AMERICA.

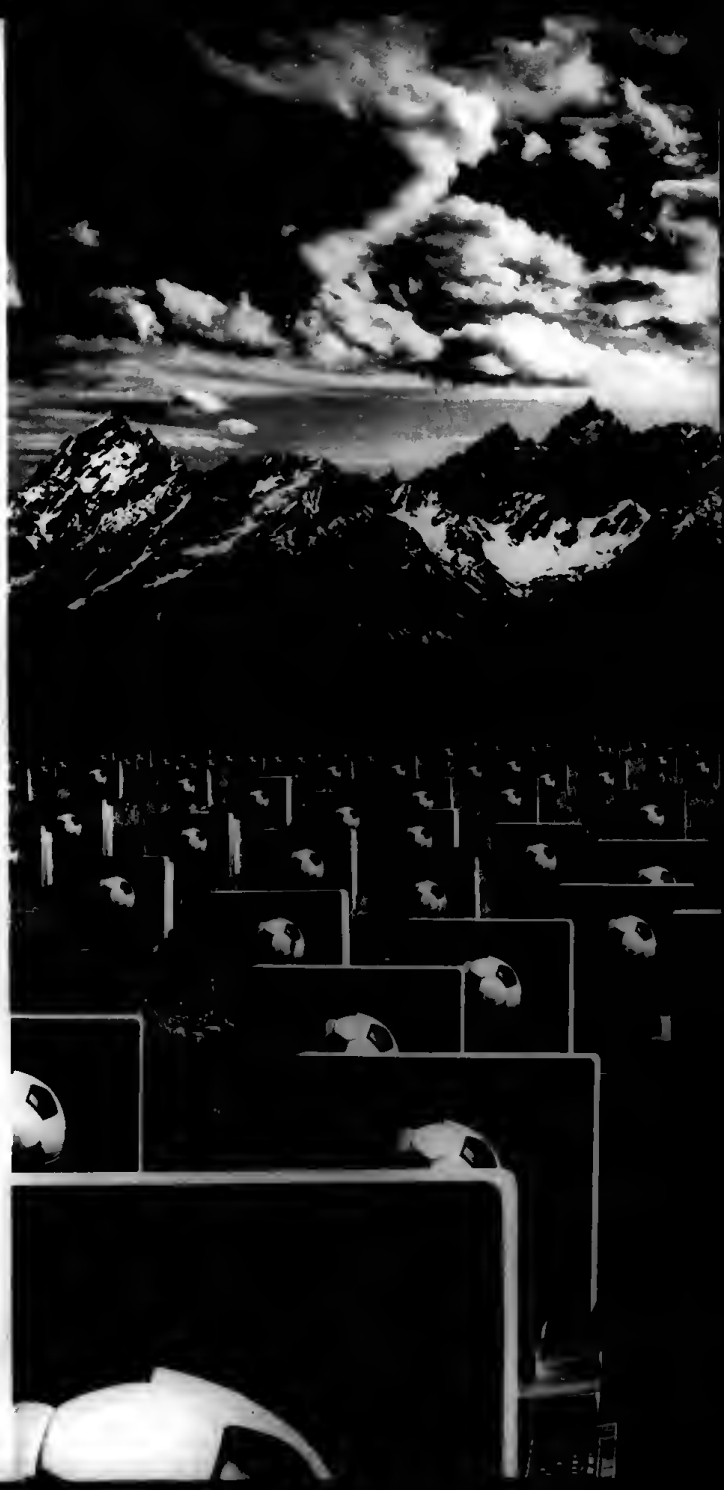


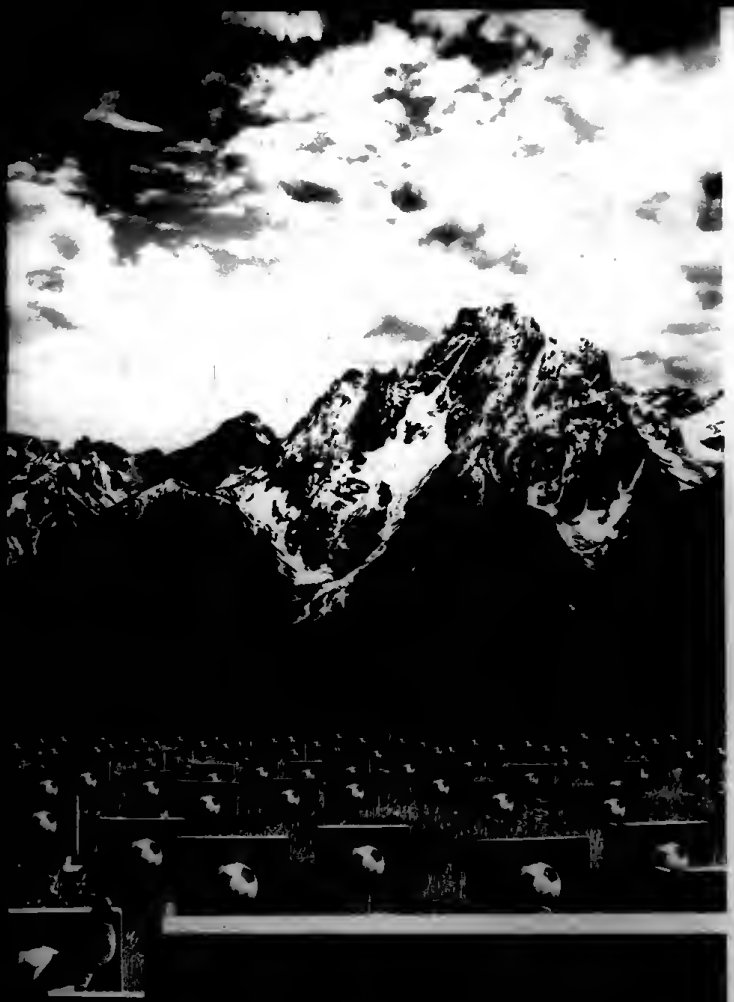
There are the little sports: The Super Bowl, The World Series, The Olympics. ◆ Then there is World Cup Soccer. ◆ An event so huge, even jaded sports fans still speak of it with wonder. ◆ Twenty-four of the best soccer teams from around the world will play fifty-two games in a four-week period, with a television audience of more than 32 *billion* people. ◆ When World Cup players meet on the field, they'll represent the pinnacle of achievement in a sport that last year alone saw more than 150 million *registered* athletes compete in 147 nations. ◆ Indeed, The World Cup is the single-



biggest sporting event in the world, based on a sport so ancient, it is almost woven into the genes of mankind itself. ◆ Before there was a Roman Empire, there was soccer. Before there was Michelangelo, there was soccer. Before the Mona Lisa smiled, soccer balls were being kicked throughout China, parts of Africa, and much of Europe. ◆ Now, as championship play in the World Cup soccer games kicks off next June, World Cup Soccer will reach America's shores for the very first time. ◆ Nine U.S. cities will host the final games: Boston, New York, Washington, D.C., Orlando, Chicago, Detroit, Dallas, Los Angeles, and San Francisco. With three and a half million tickets sold. And twenty-seven thousand volunteers. ◆ Behind it all, running the whole thing,

will be one special kind of computer. ◆ Sun? ◆ More than a thousand Sun workstations will be linked with fifteen Sun servers housed in three separate headquarters. Every mission-critical application will be run on Sun: Event management, office management, and database management. ◆ A global press corps numbering 10,000 to 15,000 will be photographed, credentialed, and registered in a database available to any World Cup official on the network, anywhere in the world. ◆ Press centers in soccer stadiums across the U.S. will be using Sun computers to access simultaneously the World Cup information systems. ◆ World Cup staff will be able to create, file, and transmit documents using either DOS or UNIX computer applications, reducing the need for computer retraining. ◆





And all this will take place across a network that brings video, text, and data to everyone's desktop. ◆ When the World Cup championships land in America in June 1994, more people will be watching than watched the landing on the moon. ◆ And a few eyes may also be on the computer that was judged simple to use, yet powerful enough to run the world's largest sporting event. ◆ More than 135,000 organizations are using Sun systems, powered by the SPARC® chip and the Solaris® operating environment, to gain a competitive advantage. The World Cup is just one. To learn how you can benefit, call 1-800-426-5321, ext. 6054.

Sun

Sun Microsystems Computer Corporation
A Sun Microsystems, Inc Business
© 1994 Sun Microsystems, Inc

Exclusive Computer Supplier To The 1994 World Cup

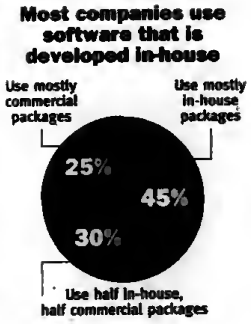
Continued from page 29

top priority. The division has appointed a small task force to establish standards and spearhead training efforts.

Dana Toraason, a member of the task force group, says the challenge isn't just acquainting systems personnel with the ins and outs of new tools but actually getting them to change the way they think. Otherwise, she says, "We'll build applications that still look like mainframe applicatioos."

At Toraason's recommendation, classes were given in the Martin/Odell object-orieoted programming methodology. The objective was learning to think in terms of modeliog the enterprise rather than just one applicatioo. Once these concepts had been absorbed, other classes delved specifically into use of the Smalltalk language.

"It was like turning the world upside down," Toraason recalls. "For traditional Cobol programmers, nsing a language like Smalltalk is as much of an unlearning as a learning experience. Fortunately, we already have familiarity with reuse and black-boxing of Cobol subroutines, making it less of a leap as we adapt to the Smalltalk approach."



Deere has adopted a *Field of Dreams* model with the curriculum: "Build it and they will come." Team members are encouraged to follow their interests and preferences as they are exposed to new technologies.

The key here is patience. "It takes people a while to warm up to the idea of changing their whole techoical environment," says Dave Kelley, manager. of computer systems at Deere's Lawn and Grounds Care Division. His advice to others heading down the same road is: "Try to find a handful of champions who can share the vision with the rest of the organization and gradnally hroaden their horizons."

Federal Express Corp. leaves less to chance. According to Vice President and Chief Information Officer Dennis Jones, managers in the information technology group are expected to individually tailor training programs for the people who report to them. These programs are not strictly technical — hasic survival skills such as project management are also part of the mix—hut getting people safely and sanely through a period of major technical upheaval is clearly the overriding goal.

"Anytime you go throngh an enormous transition like the one facing us now — from mainframe model to client/server model — yon have to cope with a lot of uncertainty and a lot of new learning requirements. Training can help you deal with both."

WHY RETRAINING MAKES SENSE

Training can be costly: The average cost of equipping a staff member for a major change in the technical environment is about half the person's salary at the outset and then $5,000 every 18 months or so. Still, many *Premier 100* companies argue that it is far better to spend money on retraining than to hring in fresh recruits. New hires might have the technology down, but they won't know your organization or your husiness the way your current staff does.

"Our existing people are valuable partly because of their working knowledge of the husiness," says Dave Kelley, manager of computer systems at the Lawn and Grounds Care Division of Deere & Co. "We've found that's more important than having someone who knows a new operating system or set of programming tools."

This is true for a lot of companies that implement client/server systems. One reason Is fhat many of the applications being planned and huilt cross numerous functional areas, and this large-scale integration reqoires hroad orgnnizational understanding. In personnel terms, that means it is easier to teach new technical information to existing staff members than to teach technically savvy newcomers about business processes.

The need to link new systems with legacy applications is also a strong argument for bringing current staff up to speed, rather than restaffing. "Don't underestimate the integration required during the transition as you connect new systems with old," says Dana Toraason, a member of a Deere task force to establish standards.

Knowledge gap

At Textron, Inc. in Providence, R.I., an internally developed standards and procedures document is used to bridge the gap between the general knowledge dispensed in training and the activities programmers mnst relearn as they move from developing with mainframe Cobol to Micro Focus, Inc.'s Cobol Workbench.

Formal training in OS/2 and Micro Focus Cobol can't do much more than scratch the surface, says Bob Edgar, manager of corporate husiness systems at Textron. "Even after you have had the OS/2 training, you probahly only know a fraction of what OS/2 can do," he says. "The biggest challenges come with the shift to a multitasking environment, since it involves relearning how programmers work."

That's where the standards and procedures document and Bill Totten come in. Totten, a senior analyst on Edgar's team, is essentially codifying lessons learned during pilots of application development in the new environment. Still in preparation, the final document



Textron's Bob Edgar (left) and Bill Totten are using lessons learned on pilot testing to break out of old frameworks

will include tips on project management, PC file maintenance and management, testing procedures, platform-to-platform integration and a host of intangibles he has uncovered during pilot programs.

"This document is geared specifically toward developing mainframe applications within a LAN environment," Totten says. "It's an evolving document tailored to our business, our systems, our architecture. Even the best plans for automation won't work the way you think they will unless you have procedures in place for how they pertain to your specific needs and work environment."

Who does your application development?

28% Contractors

72% Internal staff

"Once you have a development workstation on your desk, you have your own processing environment," he adds. "The ability to check, edit, compile and animate code in one process can streamline the testing. But it is an entirely different approach and takes some getting used to."

Takes times

Users also need time and assistance in getting used to the new styles of applications being produced and learning how to exploit new access tools.

At Harley-Davidson, Inc., MIS director Rich Kolbe says an important part of making that happen is a new training facility staffed with a former English teacher/computer salesperson and equipped with network-attached PCs that also connect to the company's Application System/400s.

End users come for instruction and to critique applications in process. IS personnel learn not only about new technologies but also about softer skills such as collaboration.

At Wal-Mart Stores, Inc., the education in user requirements is even more experiential. Programmers learn new skills through cross-pollination — working on projects that cross functional areas and technologies — and by regularly working stints in stores or distribution centers. ■

— David Baum is a Santa Barbara, Calif., free-lance technology writer.

PHOTOGRAPHY BY BRIAN SMALE

T·E·A·M PICTURES

No doubt about it, teamwork works. Here are just a few of the business/IS combinations that are scoring big at *Premier 100* companies:

The Boeing Co.

Jim Eaton (right) and Steve Henrikson set up an office in a Boeing warehouse in Seattle to build a client/server publishing system for training documentation. There, Eaton, system manager at the Commercial Airplanes Group (on the user environment side), and Henrikson, systems project manager at the Computer Services Group, have been managing a team to replace an old mainframe-based system with a client/server-based system. The new system makes training information more accessible to pilots and customers. "We wouldn't have been able to do this if we weren't located in the same place. It's helped us learn a lot more about what each person is doing, and build a better relationship," Henrikson says.



Outboard Marine Corp.



When Jack Feurig returned Dennis Ervin's call at 2 a.m. during the launch of their new networking system, Ervin realized that IS isn't the only organization with high demands and tight schedules at this $1 billion marine engine and boat manufacturer. For seven months, Feurig, director of market development and sales administration (front), worked closely with project managers Ervin (left) and Rich McCarthy (top center) to develop the PC-based Outboard Marine Network Integration system. The internal network gives sales and distribution staffs across the country direct access to information on product availability and allows outside dealers and sales staff to communicate electronically. "We still aren't programmers," Feurig says, "but we have a much greater understanding of what a system really is and how we can look at it as a tool rather than a restriction." Also pictured (right) is Harry Adams, director of systems and data processors.

PHOTOGRAPHY (ABOVE) BY MICHAEL ABRAMSON

American President Cos.



When Peter Weiss placed his first call to Terry Fitzpatrick, the tariff-tracking process at this container and cargo transportation company was a piecemeal nightmare of drifting invoice data. The many conference calls between Oakland, Calif.-based Weiss, senior manager of international systems (above) and Jersey City, N.J.-based Fitzpatrick, manager of finance and administration, paid off for this team, resulting in a standardized DB2 IEF system to automate tariff data records and invoices nationwide. "We built up a lot of open communication and trust, which helped us gain a better understanding of their business problems," Weiss says. "We had a lot of technical hurdles to jump, and we wouldn't have been able to do so without the communication and trust we had."

MCI Communications Corp.

Two years ago, Dan O'Connor and other members of business services realized they could dramatically improve sales force success if branch office personnel had easy access to information such as invoices and customer profiles. O'Connor (right) attempted to do this in the traditional way, with a lot of requests and paper forms passed back and forth to information systems. But when he finally teamed up with Joe Zuccari (left), director of systems engineering of the market segment, the time it took to deploy a branch automation system was suddenly cut in half. With a staff of about 40 people, the team designed Branchworks, which allowed branch sales and service people to access information in a matter of minutes instead of a few weeks. Zuccari says, "I have a much better understanding of our business and how our business process works, which allows me to better suit their needs. As a team, we can implement things much more quickly. Now my piloting and proving of concept cycle time goes way down because I understand the business more."





Kellwood Co.

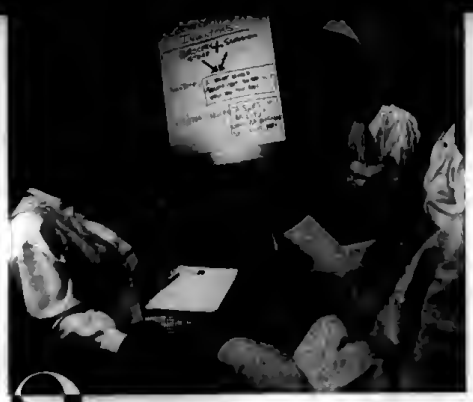
Consultants Ed Nelson and Sam Craig were well-acquainted with manufacturing requirements at Kellwood, a clothing and furnishings maker. But when the firm bought Decorp, a women's specialty dress house, in October 1990, its IS staff had to tailor Kellwood's manufacturing resource planning and payroll system to a different retail world. "Kellwood has traditionally been in business with department and chain stores," says Nelson (left), explaining why he and Craig (right) needed the expertise of Decorp's director of finance, Terry Davis, to do the job right. "With specialty stores, the number of dollars and invoices is smaller, and analysis and forecasts are different."

PHOTOGRAPHY (CLOCKWISE) BY TOM ZIMBEROFF, ANN STATES AND REID HORN

DO TRY THIS AT HOME

BY ERIN CALLAWAY

Safety-tested at Premier 100 *companies, these innovative tactics could work for you, too*



1 Data Esperanto

From its earliest nse of electronic data interchange (EDI) in tbe 1980s, tbe information systems organization at Pet, Inc., a producer of prepared food and confections, decided all new internal systems would "talk EDI." Making adberence to EDI standards part of the requirements for all applications and building those standards into computer-aided software engineering tools and data modeling metbods bas eliminated tbe labor of after-the-fact translation of internally created documents into formats usable by external customers. The result: speedy communication.

2 Leaders-in-training

At The Travelers, to create IS leaders wbo understand the business structure, the company has constructed a management development program. The Accelerated Development Program for Tomorrow's IS Leaders, or Accent, selects high-potential new employees, including recent college graduates with computer science degrees, and rotates them through three IS positions and one nontechnical business position as part of tbeir management training. Accent bas produced many IS staff members who appreciate business needs, but tbe surprise benefit has been tbe number of trainees — 34% of the current graduates — who have chosea to stick with the business side upon completion.

3 Creative wire-heads

End users at Roadway Services, Inc. used to complain that, before tbey could even finisb explaining their needs, staff members at Summit Information Systems, would offer an automation solution. Jerry Long, vice president of the IS operation, decided to break through this "wire-head way of solving problems" by arranging a worksbop on creativity and interpersonal skills. Exercises included one that gave participants two unrelated items such as low-income bousing and air transportation and asked them to develop tbe combination into a marketable product or service. The point was to teacb IS staff members about teamwork, unconventional thinking and tbe importance of recognizing tbat "not every problem bas a 100% solution."

4 Joined at the wallet

At Roadway Services, IS service levels aren't just the concern of the IS snbsidiary, Summit Information Systems. Availability of on-line systems and on-time delivery of applications by IS are factored into corporate calculations of profit-sharing for all employees, right along witb more traditional measures of business performance. Monetary interconnectedness seems to work. The number of on-line systems failures dropped from 365 in 1991 to only 120 in 1992.

5 Support your local IS

Rubbermaid Commercial Products, tbe Winchester, Va., division of Rubbermaid, Inc., recently invited IS managers at area businesses to attend the charter meeting of a noncompetitive coalition for shared information resources. Twenty-five people representing 18 companies attended to discuss goals. At the top of the agenda, according to Gary Senese, vice president of IS at Rubbermaid Commercial, was a discussion of cost-effective training methods, including an idea to have members with expertise in particular software — "power users" — train their coalition colleagues. The idea, Senese says, is to make the kind of casual skill-sharing that often occurs within firms an accessible community resource.

PHOTOGRAPHY BY JACK VAN ANTWERP

6 No more pass/fail

At Mellon Bank Corp., internal customers don't just evaluate IS services — they grade them. At the end of oext quarter, Mellon's IS group will receive letter grades from each husiness unit for its overall quarterly performance and for each project it completes. The technology "report card" will allow Mellon IS to set tailored project goals hased oo the needs of individual uoits and then benchmark precisely those areas needing improvement. Io addition, Melloo IS will use a generic card to grade the services it provides to all its customers.

7 Electronic prodding

Customers receive fast actioo oo complaints these days at industrial and agricultural chemical producer Rohm & Haas Co., thanks to a worldwide complaint handling system that is tied into the order-eotry system. The system automatically sends eotered complaints through electronic-mail to an assigned "owner" and follow-up person and begins clocking the time for the problem to he resolved. If some actioo is not taken in a specified time, the system seods reminders to both people and cootinues to do so uotil the problem has been handled.



8 Idea drive

At Broan Manufacturing Co., a subsidiary of Nortek, inc. aod manufacturer of large home appliances, IS staff members are eocouraged to participate in a companywide Fresh Idea Program, which is an inceotive plan that invites company employees to preseot their ideas to a review committee of rotating represeotatives from each user departmeot.

The committee accepts ideas based oo several criteria such as safety and convenieoce, hut bottom-line company savings is the key. Ron Yogerst, operations analyst at Broan, called the committee's attentioo recently to a wasteful five-page shipping form. This process led the company to develop a streamlined order-entry system that will save Broan nearly $8,000 annually. Yogerst's idea cootrihuted to a total 1992 IS savings of $20,000.



9 Camp Depot

The IS staff at The Home Depot, Inc. is one group who knows about challenges and the importance of working together. For three years, IS staff memhers have participated in special Outward Bound programs that are held in the nearby mouotains of North Carolina. Their most recent trip was to Franklin, N.C. This trip consisted of rock climbing, hiking, white water rafting and, of course, IS problem-solving. Besides learning how to survive in the wilderness, IS personnel learn to communicate efficiently and respect one another's strengths.

Working toward the commoo good is an idea that the organizatioo puts into actioo in other ways as well. Each Christmas seasoo, more than 80% of the IS staff voluoteers for weekend retail shifts at Home Depot stores. But that's oot all they do: This summer, the entire IS departmeot has beeo spending their Saturdays building low-income housing with Habitat for Humanity.

10 'Isn't that your bolt?'

At Northrop Corp., a manufacturing ahop floor system oot only clears away paper clutter hut also creates an easy-to-follow trail for every plane that is built. The system provides mechanics with on-line work instructions and records job progress and inspection check-offs. Used through the entire manufacturing process from instructioo to inspection, the system makes it possihle to trace problems back to a specific stage in manufacturing and to specific individuals who worked on the project. As a result of this system, productioo times have been reduced. The system times production as well, thus reducing the oumber of hours for each job. It also allows mechanics to identify which parts they installed. ■

PHOTOGRAPHY (LEFT) BY JAMES SCHNEPF

16,000 experts
800,000 clients
125 countries

A Fortune 500 company?

©1995 Sun Microsystems, Inc SunService, EarlyNotifier and SunSolve are trademarks of Sun Microsystems, Inc SunSpectrum and SunTune are service marks of Sun Microsystems, Inc



Actually, it's SunService.

These days, the most impressive performance isn't just inside your Sun™ computer. It's behind your Sun computer, too, with SunService.℠

Sixteen thousand experts in 125 countries support more than 800,000 Solaris®/SPARC® systems, making SunService the world's largest installer and supporter of UNIX-based client-server systems.

And SunService is expanding support to other Sun products as well, including Solaris on Intel.

As a Sun customer, you'll draw from 100 training centers and 24 solution centers for hardware, software, and network support. You can cover your entire enterprise with SunSpectrum℠, SunService's new, flexible service contract that's easy to buy and even easier to administer. And SunSpectrum will provide you with easy-to-use support tools, such as SunSolve,℠ Sun EarlyNotifier,℠ and SunTutor.℠

How well have we met your needs?

Recently, for the third consecutive year, Sun was awarded a loyalty rating of 91 percent or higher from its customers. And SunService has helped to make the cost of owning Sun among the lowest in the industry.

But as for how satisfied we are? Well, we're still working on that last nine percent.

SunService

A Sun Microsystems, Inc. Business

Announcing

EXECUTIVE TECHNOLOGY SUMMIT'94

February 2-4, 1994

Innisbrook Resort
Tarpon Springs, Florida

The Society for Information Management (SIM) and Computerworld have joined forces to provide a candid assessment of three frontline technologies:

- Client/Server Computing
- 32-bit Operating Systems & Applications
- Imaging/Workflow Technology

Presentations and discussions by leading information systems practitioners who are successfully implementing these technologies in their organizations. Focused solution labs will provide you with a unique opportunity to analyze, question and evaluate these important technologies.

For more information call (800) 884-6473

Outside the U.S. and Canada, call (312) 644-6610

SIM The Society for Information Management & COMPUTERWORLD

Whatever happened to . . .



BY MICHAEL SULLIVAN-TRAINOR

The *Premier 100* ranking traces changes in the business and information systems activities of the largest public companies in the U.S. While each year our annual list highlights companies making an impact with technology in their businesses, it also indicates which companies have had business reversals or IS turmoil that knocked them out of the spotlight. The following companies have had such difficulties.

Aetna Life & Casualty Co. Ranked in the Top 5 in 1991, Aetna experienced an 89% decline in profit in 1992, partly because of trouble with real estate loans. The company reorganized its commercial and personal insurance and business services divisions into independent units. Parallel efforts were made to reduce and tighten the IS group. IS budget and staff were reduced significantly in 1992 and 1993.

Amoco Corp. After reaching a high of more than $2 billion in net income in 1988, Amoco profits have declined each year. The company reported a $74 million loss in 1992, along with a 12% reduction in employee head count.

Dow Chemical Co. Steady IS investments focusing on global communications projects failed to keep the company from dropping in the ranking in the face of profit problems. A $489 million loss in 1992 followed a 1991 reduction.

Eastman Kodak Co. While the jury is still out on outsourcing, Kodak has experienced significant ups and downs in its business causing its ranking to change as well.

Eli Lilly and Co. After making the ranking cut in 1991, Lilly was outdistanced by other strong-performing IS organizations. In acquisition mode in 1992, the company posted a 46% decline in profits.

Lockheed Corp. Now is a bad time for a company to have 70% of its business tied up in the defense industry. Lockheed is in the middle of a post-Cold War conversion to nondefense businesses. A $283 million 1992 loss reflects the urgency of this transition, which has also caused significant expense reductions.

Security Pacific Corp. Acquired in 1991 by BankAmerica Corp., Security Pacific's Automation Co. was one of the industry's strongest IS organizations. Since then, BankAmerica has been gradually merging with Security Pacific's operations.

Sears, Roebuck and Co. A consistent *Premier 100* winner, Sears dropped out of the Top 10 for the first time in 1993 due to continued struggles capped by a $3.9 billion loss in 1992. Its IS organization is moving to a more responsive service organization.

The Timken Co. Declining profit and flat revenue overshadowed a strong IS effort in factory automation, which brought Timken to prominence in the *Premier 100*. The company reported $4 million in profit on $1.6 billion in revenue last year. ■

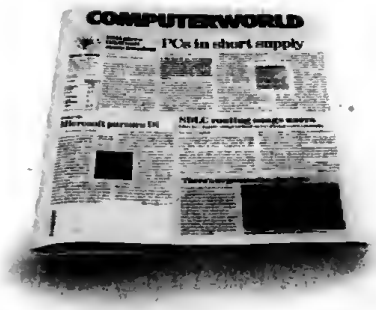
Shifting rankings

Changing business circumstances have resulted in less prominence for the following former top-ranking *Premier 100* firms:

COMPANY	YEARS IN TOP 5
Aetna Life & Casualty Co. Insurance	1991
Amoco Corp. Petroleum	1988, 1991
Dow Chemical Co. Chemical	1988, 1989, 1990, 1991
Eastman Kodak Co. Manufacturing	1988, 1991
Eli Lilly and Co. Pharmaceuticals	1990, 1991
Lockheed Corp. Aerospace	1988, 1989, 1992
Security Pacific Corp. Banking	1989, 1990
Sears Roebuck and Co. Retailing	1988, 1989, 1990, 1991, 1992
The Timken Co. Industrial	1989, 1990, 1991

ILLUSTRATION BY ROBERT NEUBECKER





IT'S NOT HOW MUCH YOU READ.

You can read a knee-high stack of computer magazines each month and still not find the depth and breadth of news and information you'll discover each week in the pages of *Computerworld*.

As the only weekly newspaper for IS professionals, *Computerworld* is filled with up-to-the-minute articles on topics ranging from products and people to trends and technology. We cover it all — PC's, workstations, mainframes, client/server computing, networking, communications, open systems, languages, industry news, and more.

It's everything you need to know to get an edge on the competition.

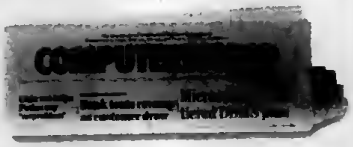
That's why over 138,000 IS professionals pay to subscribe to *Computerworld* every week. Shouldn't you?

IT'S WHAT YOU READ.

Order *Computerworld* and you'll receive 51 information-packed issues. Plus, you'll receive our special bonus publication, *The Premier 100*, an annual profile of the leading companies using information systems technology.

Call us toll-free at **1-800-343-6474**. Or use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Then you can spend less time reading about the world of information systems. And more time conquering it.



The Newspaper of IS

COMPUTERWORLD

SAVE OVER $5

Professional Courtesy Discount

51 issues for ~~$[illegible]~~. *Now only $42.95**

YES, I want to receive my own copy of COMPUTERWORLD. I accept your offer of $42.95* for 51 weekly issues. That's a savings of over $5.00 off the basic rate.

Address is: ☐ Home ☐ Business Basic rate: $48 per year *U.S. Only. Canada $74.97, Mexico, Central/South America $130 Europe $196, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Name

Title

Company

Address

City State Zip

Please complete the information below to qualify for this special offer.

1. BUSINESS/INDUSTRY (Circle one)
10. Manufacturer (other than computer)
20. Finance/Insurance/Real Estate
30. Medical/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government - State/Federal/Local
65. Communications Systems/Public Utilities/Transportation
70. Mining/Construction/Petroleum/Refining/Agriculture
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Dist./Reseller
95. Other _____ (Please Specify)

2. TITLE/FUNCTION (Circle one)
IS/MIS/DP MANAGEMENT
19 Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
21 Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs. Data Comm. Network Sys. Mgt., LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31 Programming Management, Software Developers
41 Engineering, Scientific, R&D Tech. Mgt.
66. Sys. Integrators/VARs/Consulting Mgt.

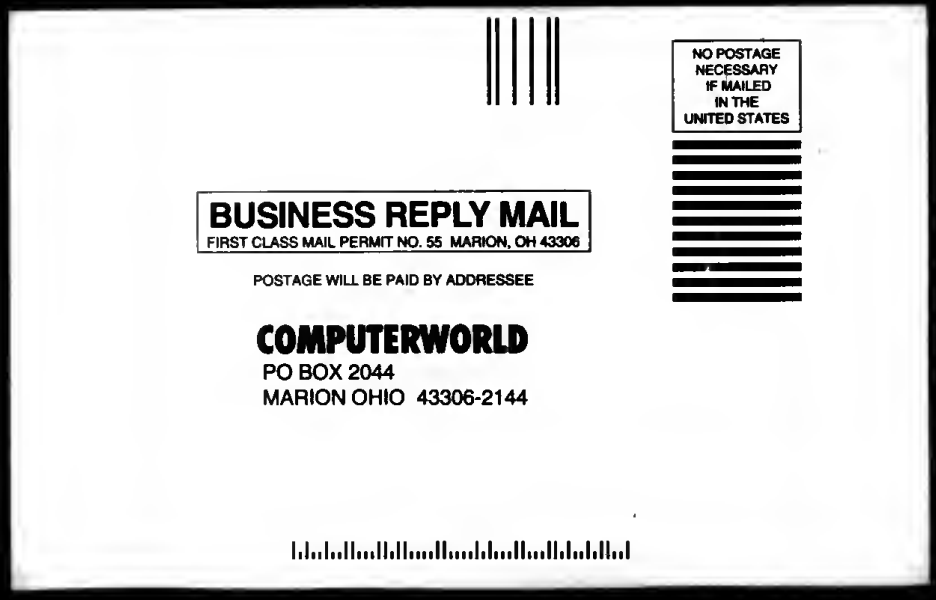
CORPORATE MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51. Sales & Mktg. Management
70. Manufact., Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
80. Educator, Journalists, Librarians, Students
90. Other Titled Personnel

3. Are you involved in the purchase or use of the following: (Circle all that apply.)
a. Networking/Communication/Equip.
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

E4JSP-7



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
PO BOX 2044
MARION OHIO 43306-2144



COMPUTERWORLD

Professional Courtesy Discount

51 issues for ~~$48~~. *Now only $42.95*

YES I want to receive my own copy of COMPUTERWORLD. I accept your offer of $42.95* for 51 weekly issues. That's a savings of over $5.00 off the basic rate

Address is: ❒ Home ❒ Business Basic rate $48 per year *U.S. Only
Canada $74.97, Mexico Central/South America $130 Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Name

Title

Company

Address

City State Zip

Please complete the information below to qualify for this special offer.

1. BUSINESS/INDUSTRY (Circle one)
10. Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30. Medical/Law/Education
40 Wholesale/Retail/Trade
50 Business Service (except DP)
60 Government - State/Federal/Local
65 Communications Systems/Public Utilities/Transportation
70 Mining/Construction/Petroleum/Refining/Agriculture
85 Manufacturer of Computers, Computer-Related Systems or Peripherals
86. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90 Computer/Peripheral Dealer/Dist./Retailer
95 Other _____ (Please Specify)

2. TITLE/FUNCTION (Circle one)
IS/MIS/DP MANAGEMENT
19 Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
21 Dir./Mgr. MIS Services, Information Center
22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt., LAN Mgt., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31 Programming Management, Software Developers
41 Engineering, Scientific, R&D, Tech. Mgt.
60 Sys. Integrators/VARs/Consulting Mgt.

CORPORATE MANAGEMENT
11 President, Owner/Partner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51 Sales & Mktg. Management
70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
80. Educator, Journalist, Librarians, Students
90. Other Titled Personnel

3. Are you involved in the purchase or use of the following: (Circle all that apply.)
a. Networking/Communication/Equip.
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

E4J3P-7



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
PO BOX 2044
MARION OHIO 43306-2144



HOW We Measure Effectiveness



This year's *Premier 100* combines two methods of measuring information systems' effectiveness: The amount of investment in information technology in key areas and the quality of performance the company exhibits in its business and IS initiatives.

TARGET COMPANIES

Our target group consists exclusively of large, publicly traded corporations, ranging in revenue from $300 million to more than $100 billion. Only parent companies are ranked. Thirty-three industry groups are included as listed in the Fortune Industrial and Service 500.

SOURCES OF DATA

The data for this report come from a telephone and fax survey of 600 corporations. The top IS executive at the company is used as the primary source for all information, except chief executive and peer ratings (see below). Profit and revenue figures are from public sources, as are categorizations of the company's primary line of business. Where company sources cannot provide the data, we work with analysts, internal databases and public information to develop estimates for key figures.

INVESTMENTS

We begin with a look at the IS investment, which demonstrates whether the company is committed to technology at a rate that matches or surpasses its competitors. We measure IS budget as a percentage of revenue for the corporation's entire holdings, including all subsidiaries. This figure is compared to industry average spending for that company.

The IS investment is further examined by measures of staff spending, training spending and the value of major processors as a percentage of revenue. Taken together, these figures indicate whether the company is being cost-effective in staffing, without skimping on training or on acquiring new technology. More points are awarded for higher training and value ratios and lower staff ratios.

PC NETWORKS

Another measure of a proactive technology user is the spread of PCs and terminals among all employees. More points are awarded for a higher ratio of PCs and terminals as a percentage of employees.

This year, for the first time, we have also factored in the ratio of networked PCs to total PCs and granted additional points to the more highly connected companies.

BUSINESS PERFORMANCE

Reaching beyond these measures of cost-effectiveness is a set of criteria that reveal the results of these investments.

We measure five-year profit growth to determine if the technology is paying off in business success. While technology and profitability are not tightly coupled, few IS organizations can be said to be making an effective contribution to business success if the company isn't making money.

MANAGEMENT RATING

We look at how well-positioned the IS organizations are to match the business needs.

More points are awarded to companies with IS organizations that are tightly linked to business strategic plans, investment decision-making and company view. More points are also given to those with higher investments in technology research and development, more staff dedicated to new applications and improvement activity.

EXECUTIVE AND COMPETITOR VIEWS

Peer ratings are based on the responses to a peer survey of target companies. Companies were asked to name the Top 5 most-effective users of IS in their industry groups. Companies most frequently named No. 1 received the most points.

The chief executive rating is determined by asking executives of the target companies — CEOs, chief operating officers and chief financial officers — to rate their own organizations on a five-point scale, with the lowest rating for poor performance and the highest for very good performance. The chief executive ranking was applied to the Top 200 companies only, which were determined by all the other criteria. These ratings were factored into the final ranking to determine the Top 100.

WEIGHTING MEASURES

Our weighting system counts all the measures equally except the peer rating, which receives twice the value of any other area. ■

ILLUSTRATION BY JAVIER ROMERO DESIGN GROUP, INC

Sun salutes an IS visionary



When Wells Fargo computer programmers came to their senior manager, Roy Camblin, with a "major catastrophe," he naturally expected the worst. It had been a challenge to convince the crew to downsize from a mainframe to a UNIX®, client-server platform. The mainframe wasn't broken, they had said, so why fix it?

And now, three-fourths of the way through the migration, they were presenting him with a design bug, ample evidence of their initial concern. "How long will it take to fix?" Camblin asked apprehensively.

"A day and a half," they responded.

Camblin heaved a sigh of relief.

In the mainframe world, these types of problems could take six to nine months to fix. It could cost the project. It could cost a manager his or her job.

"It actually took closer to a week to fix the bug," Camblin recalls. But it was at that critical point in the conversion that Camblin, already a believer in UNIX and the open systems, client-server solution, became an evangelist for the cause.

The pilot project at Wells Fargo's wholesale banking division in San Francisco was initiated in December 1991. The goal was to rightsize a department known as the risk management group using Oracle® software and Sun's Solaris® operating system, running on Sun SPARCserver™ and SPARCstation™ systems.

The conversion provided all the advantages Wells Fargo had hoped for in a computing solution: lower costs, flexibility, accessibility, speed and power.

It has convinced the bank to explore converting as many applications as possible to UNIX over the next few years.

Camblin's efforts have not gone unrecognized. He was named winner of the 1992 Sun Visionary of the Year Award, the first recipient of the annual title established by Sun Microsystems, Inc.

"Roy Camblin is undoubtedly one of the most trend-setting and forward-thinking information managers out there," says Bill Raduchel, Sun's chief information officer.

"He has gone out on a limb to reengineer at Wells Fargo by forsaking the traditional MIS models and developing an innovative approach for a complex, high-risk, high-security application."

Camblin's soft-spoken demeanor belies a rather dramatic resume, which includes performing in a circus in his college days and flying T-38s as an instructor in the Air Force and helicopters in the Army Reserves.

His career in information systems has been equally impressive, rising through the ranks of discount brokerage firm Charles Schwab & Co. and Wells Fargo's credit card division before assuming the senior vice presidency of systems and operations for its wholesale division.

But all that might seem tame compared to the past year. After being awarded the Sun Visionary title a year ago, the 46-year-old has risen from relative anonymity to a key role as a proponent of open systems and UNIX, interviewed and quoted by many of the major computer trade publications. He says he doesn't mind the attention, but he is quick to share the spotlight with his supervisors and subordinates at Wells Fargo.

"I provided the senior management – the leadership. But I don't pretend to be the one who figured everything out. It was a team effort," he says.

But it was Camblin who convinced the group to look to the future.

"I explained that tried-and-true methods won't get us to where we need to be three years from now," says Camblin.

"This is not just reengineering, or downsizing, or moving databases, or putting a more flexible front end on legacy systems. It's all those things and more. It's reengineering the way we do business."



As the champion of open systems and rightsizing technology, Sun Microsystems, Inc. established an annual award in 1992 to honor those who create an organization-wide, client-server solution that improves efficiency, saves money and puts technology into the hands of front-line employees.

The first award was presented to Wells Fargo senior vice president Roy Camblin, who received a $10,000 check to donate to the educational institution of his choice.

The recipient of the 1993 Sun Visionary of the Year award will be named at a ComputerWorld dinner in New York in October honoring their Premier 100 winners.



Sun

Sun Microsystems Computer Corporation
A Sun Microsystems, Inc.

The Network Is The Computer

MAKING THE G

Peer ratings:
You're doing something right when rivals respect you

While there are many ways to gauge information systems effectiveness, one of the most telling clues is how a company is viewed by its peers. Strong IS initiatives have a direct impact on competitors. Competitors are also well aware of weaknesses that they can exploit with their own IS efforts.

Since 1991, we have tracked the most well-respected IS organizations through the *Premier 100*'s annual Peer Rating. Companies are asked to choose the most effective users of IS in their industry (excluding themselves).

For three consecutive years, four firms have received the highest ratings in their industries: Air Products and Chemicals, Inc., The Boeing Co., Federal Express Corp. and Wal-Mart Stores, Inc. Here's what competing firms say about them:

Air Products and Chemicals "is successfully addressing business needs and networking."

Boeing "has a hreadth and depth of technology applications in engineering and manufacturing. The company effectively uses its people resources and aligns IS with company goals."

Fedex "understands the importance of technology. The company has world-class shipment tracking and customer service systems. It's a standards-setter. We're very impressed with how they add value for their customers and generate customer enthusiasm for IS."

Wal-Mart "has strong point-of-sale and replenishment systems. Their centralized buyers can talk directly to their wholesalers through computer linkups, resulting in significant deals. The company pushes the limit of business by using technology."

Out with the old...

This year has brought in the following new firms with high ratings:

Abbott Laboratories, cited for its business partnerships.

AMR Corp., named for "the range of applications of technology and its reservation systems."

Cigna Corp., selected for its re-

Peer review

The following companies received the highest ratings from their fellow IS executives:

- Abbott Laboratories
- Air Products and Chemicals, Inc.
- AMR Corp.
- The Boeing Co.
- Cigna Corp.
- Federal Express Corp.
- The Travelers
- US West, Inc.
- Union Pacific Corp.
- UAL Corp.
- Wal-Mart Stores, Inc.

engineering efforts.

The Travelers, dedicated to research and development in technology. It has created an impressive insurance regulation/customization system that spans all 50 states.

US West, Inc., picked because it uses large IS applications to offer a range of service options.

Union Pacific Corp., for "top management participation in IS."

Beyond the highest-rated companies are those that competitors single out because of their outstanding IS initiatives. Some of the firms and the kudos offered by industry competitors follow:

Aerospace: Martin Marietta Corp. — "The company uses IS in an integrated fashion. From product definition through manufacturing, their cross-functional integration is the most seamless of any organization."

Consumer products and services: *The New York Times* — "They've been very innovative in past years. We nsually use them as a guide as we try new things."

Financial services: United Services Automobile Association — "They have strong personnel, customer handling and work procedures as well as innovative image processing in customer service."

Industrial and automotive products: Ford Motor Co. — "The company is faster than the competition in exploring and adopting new ways of using IS."

Manufacturing: Xerox Corp. — "Management is successfully sponsoring new systems directions."

Petroleum and chemicals: The Dow Chemical Co. — "They are effectively using technology in strategic businesses."

Pharmaceuticals, food and beverages: Johnson & Johnson — "They have been a leader in engineering simpler application interfaces for customers and distributors."

Retailing and wholesaling: JC Penney Co. — "Changes have been made in IS, making the company more competitive by getting goods to the stores more efficiently."

Transportation: Airborne Freight Corp. — "High-quality applications combined with automation makes them extremely competitive."

Utilities: SCECorp — "The company uses technology and telecommunications effectively to support corporate strategies. It has capable management and a good IS infrastructure."

GRADE

Executive ratings: *The ingredients of outstanding management*

To be truly effective, an IS group has to be more than efficient. It must contribute significantly to business success, and that won't happen without excellent management. Such management involves organizational structure, alignment of IS goals with business goals, management support and the deployment of resources to match objectives, among others.

In this year's *Premier 100* methodology, we introduce a set of categories that indicate effective IS management. Consultants Richard H. Nahmias at Nahmias & Co., Michael Ashmore at CSC Index, Inc. and Howard Rubin at Howard Rubin Associates contributed to the development of these criteria:

- **Structure:** How your IS organizational structure complements your company structure.
- **Strategic alignment:** How closely your strategic IS plan is linked to your strategic business plan.
- **Reporting level:** Who your top IS executive reports to.
- **Technology perception:** How senior management views technology.
- **User feedback:** Whether or how often you conduct user satisfaction surveys.
- **Investment methods:** How you determine where to make technology investments.
- **Focus of activities:** Where you focus the majority of your IS efforts.
  - Renovating the IS structure.
  - Automating.
  - Strategic value.
  - Re-engineering.
- **Application quality:** Technical and business quality of applications that support business lines and whether you will rewrite them.
- **User spending:** How much IS spending falls outside the IS group.
- **IS research:** Percentage of IS budget devoted to R&D.
- **Staff deployment:** Percentage of staff devoted to maintenance vs. application development.

One effectively managed company according to the criteria is Deere & Co., which achieved high ratings in a number of categories. Deere's IS organization is a hybrid structure. IS strategic plans are crafted separately from business plans but are linked to business strategies.

Management views the effective application of technology as the key to the company's success. Formal cost/benefit analysis using traditional measures is used to determine where to make investments.

The majority of IS activities are at the two extremes of IS efforts: renovating IS structure and re-engineering. Ten percent of the IS budget is devoted to renovation, 20% to automation, 60% to strategic value applications and 10% to re-engineering.

The business quality of applications is high across the board, with medium to high technical quality.

Two percent of Deere's IS budget goes to R&D. Sixty percent of the staffing budget is dedicated to maintenance and 40% to application development.

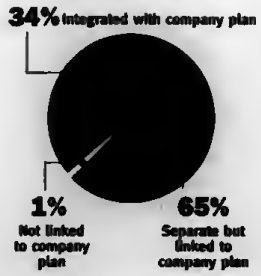
Unocal Corp. is another example of effective management. Its hybrid structure is matched by a hybrid IS organization. Strategic plans are separate but linked.

Traditional cost/benefit analysis is used to determine where to invest in IS, and annual user satisfaction surveys are conducted. The company is renovating its IS structure and dedicating 50% of its budget to the effort.

Application rewrites are under way. Staffing is divided 50/50 between maintenance and development expenditures. ■

Strategic planning

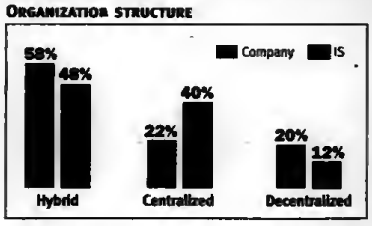
Only one-third of *Premier 100* companies do their IS planning as part of business plans



How do you match up?

Premier 100 IS organizations have the following management views and policies:

ORGANIZATION STRUCTURE



MANAGEMENT'S TECHNOLOGY ATTITUDE



ACTIVITY EMPHASIS*

Great deal of effort focused on projects that involve . . .

Strategic value	60%
Re-engineering	10%
Renovating IS structure	10%
Automating (replacing manual labor with technology)	20%

*Multiple responses allowed



1993 Industry rank	Company	Total score	Peer points	Chief executive points	Management points	IS budget (millions)
AEROSPACE						
1	The Boeing Co.	73,485	17,490	8,000	8,580	$1,509
5	Martin Marietta Corp.*	73,070	16,000	8,250	8,000	$301
5	Northrop Corp.	72,880	16,000	8,250	8,595	$222
8	Allied Signal, Inc.*	69,535	17,280	8,000	8,000	$345
5	Grumman Corp.	69,500	16,000	8,250	8,670	$146
5	Gencorp, Inc.*	67,845	16,000	7,500	8,000	$39
7	Textron, Inc.	67,755	16,000	8,000	8,640	$193
8	McDonnell Douglas Corp.*	67,285	16,000	7,500	8,000	$683
5	General Dynamics Corp.*	67,090	16,000	8,250	8,000	$350
10	Raytheon Co.*	63,980	16,000	8,000	8,000	$105
	Industry average	69,243	16,277	7,200	8,249	$389.3
CONSUMER PRODUCTS AND SERVICES						
7	Dibrell Brothers, Inc.*	77,170	16,000	8,250	8,000	$7.1
5	Hon Industries, Inc.*	76,470	16,000	8,000	8,000	$8.9
5	The Dun & Bradstreet Corp.*	74,335	16,000	6,000	8,000	$776.3
5	Helene Curtis Industries, Inc.	73,700	16,000	8,250	8,580	$25.6
5	Marriott Corp.*	73,650	16,000	8,000	8,000	$160
6	Reader's Digest Association, Inc.	73,315	16,000	6,000	8,000	$120
7	Kellwood Co.	73,015	16,000	8,250	8,000	$13.8
8	Browning-Ferris Industries, Inc.*	72,215	16,000	6,000	8,000	$20.7
5	International Flavors and Fragrances, Inc.*	71,820	16,000	8,000	8,000	$9.1
10	Emerson Electric Co.*	71,680	16,000	6,000	8,000	$71
	Industry average	73,737	16,000	6,975	8,058	$121.3
FINANCIAL SERVICES						
5	Banc One Corp.	79795	16,000	9,000	8,655	$387
5	Mellon Bank Corp.	78345	16,000	9,000	8,745	$135
5	Prudential Insurance Co.*	76470	16,000	6,000	8,000	$367.8
5	Chemical Banking Corp.*	71750	16,000	8,000	8,000	$625
5	The Travelers*	71435	17,550	9,000	8,000	$387.2

Listings continue on the following page

*Estimates are from *Computerworld* sources and not the companies



IS budget as % of revenue	% of IS budget for staff	% of IS budget for training	Processor market value (millions)	Processor market value as % of revenue	Total PCs and terminals	% of employees with PCs/terminals
5%	42%	.8%	$900	3%	118,500	80%
5.1%	40%	1%	$50	.84%	30,000	54%
4%	52%	.1%	$8	1.4%	22,000	65%
2.9%	40%	3%	$60	.5%	36,000	40%
4.2%	48%	4%	$75	2.1%	18,000	85%
2%	39.9%	1.4%	$5.5	2.8%	8,700	63%
2.3%	40%	5%	$75	8.9%	30,000	56%
3.9%	61%	5%	$137	.8%	75,000	86%
4%	53%	.8%	$113	1.3%	7,646	13%
1.2%	42.5%	3.1%	$60	.64%	34,000	53%
3.5%	45.8%	2.4%	$148.3	2.2%	37,984.6	59.5%
.7%	56.9%	2%	$16	1.4%	6,960	100%
1.3%	34%	2%	$15	2.1%	3,800	67%
16.3%	58%	2%	$150	3.1%	50,000	86%
2.5%	38.5%	1.5%	$8	.8%	3,720	120%
1.8%	42%	.8%	$20	2%	9,750	100%
4.5%	68%	5%	$29	1.5%	3,500	26%
1.5%	48%	.7%	$200	2%	11,000	78%
.6%	46%	3%	$79	2.3%	25,644	98%
.8%	42%	4%	$14	1.3%	3,469	82%
.9%	39%	4.7%	$42	.54%	52,568	75%
3.1%	47.3%	2.6%	$57.3	1.7%	17,041.1	83.2%
6.5%	27.9%	4%	$93	1.5%	42,000	100%
4.5%	48%	1%	$36	1.2%	25,000	100%
4%	42%	3%	$230	3%	81,000	80%
5.1%	63%	3%	$42	1.6%	20,000	50%
4%	50%	3%	$96.8	1%	30,000	100%



1993 industry rank	Company	Total score	Peer points	Chief executive points	Management points	IS budget (millions)
FINANCIAL SERVICES						
8	Bankers Trust New York Corp.	71,005	16,000	8,250	8,700	$450
9	Crestar Financial Corp.*	70,030	16,000	8,250	8,000	$73.7
8	Cigna Corp.*	69,605	17,460	6,000	8,000	$743.2
9	American Express Co.*	67,995	16,000	8,000	8,000	$1,078.4
10	Primerica Corp.	67,375	16,000	6,000	8,490	$358.8
	Industry average	72,381	16,301	7,350	8,259	$460.6
INDUSTRIAL AND AUTOMOTIVE PRODUCTS						
1	Cummins Engine Co.*	76,565	16,000	9,000	8,000	$32.1
2	Harley-Davidson, Inc.	74,160	16,000	8,250	8,715	$14.7
9	Great American Management & Investment, Inc.*	74,155	16,000	8,000	8,000	$10
4	Outboard Marine Corp.*	73,650	16,000	8,000	8,670	$19.7
5	Deere & Co.	73,060	16,000	8,000	8,685	$203
6	Caterpillar, Inc.	72,420	16,000	8,250	8,775	$383
9	Navistar International Corp.*	69,770	16,000	8,000	8,000	$76.3
8	Harnischfeger Industries, Inc.*	68,605	16,000	8,000	8,000	$28
9	Nortek, Inc.*	65,750	16,000	9,000	8,000	$89.5
10	Tecumseh Products Co.*	61,750	16,000	6,000	8,000	$13
	Industry average	70,988.5	16,000	7,050	8,285	$86.9
MANUFACTURING						
1	Rubbermaid, Inc.	78,050	16,000	8,250	8,000	$18
8	Phelps Dodge Corp.	76,725	16,000	8,250	8,730	$15.2
9	Westvaco Corp.	75,655	16,000	7,500	8,000	$31.5
8	Bandag, Inc.	75,335	16,000	6,000	8,000	$8.3
9	Raychem Corp.	74,790	16,000	8,250	8,000	$29.5
6	Cone Mills Corp.	74,335	16,000	7,500	8,000	$10.1
9	Polaroid Corp.	74,015	16,000	7,500	8,000	$66.5
8	West Point-Pepperell, Inc.	73,265	16,000	6,000	8,000	$17
9	Willamette Industries, Inc.	71,325	16,000	6,000	8,000	$18.6
10	3M Co.	71,300	16,000	6,000	8,000	$335
	Industry average	74,479.5	16,000	7,125	8,073	$55

*Estimates are from *Computerworld* sources and not the companies



IS budget as % of revenue	% of IS budget for staff	% of IS budget for training	Processor market value (millions)	Processor market value as % of revenue	Total PCs and terminals	% of employees with PCs/terminals
6.9%	49%	3%	$70	1.1%	15,000	100%
6.8%	41%	2%	$10	1%	5,300	90%
4%	50%	3%	$300	1.6%	52,000	100%
4%	40%	5%	$800	3%	115,000	100%
7%	51%	3%	$51	1%	15,500	100%
5.28%	46%	3%	$173	1.6%	40,080	92%
.9%	53.4%	.9%	$109.3	2.9%	23,000	100%
1.3%	38%	3%	$.8	1%	1,525	26%
.7%	42.7%	2%	$5	.4%	450	100%
1.8%	46%	3%	$8	.7%	8,400	100%
2.9%	49%	8%	$40	5.7%	20,500	60%
3.8%	52.1%	1.7%	$153.2	1.5%	36,000	71%
1.9%	43%	2%	$21	.5%	6,000	43%
2%	49.8%	1.7%	$25	1%	9,209	79%
1%	43%	2%	$5	.5%	2,200	41%
.9%	40%	5%	$6.5	.5%	5,000	39%
1.73%	46%	2.9%	$37.4	1.8%	11,228.4	66%
1%	46%	5%	$105.7	5.8%	35,205	100%
.6%	37%	2%	$3	3%	4,500	100%
1.4%	39%	4%	$211.4	1%	38,636	100%
1.4%	46%	4%	$36	2%	4,847	100%
2.3%	42%	3%	$11	.8%	7,107	62%
1%	41%	1.7%	$8	1%	13,525	98%
3%	28%	3%	$12	.5%	3,500	29%
1.1%	40%	5%	$45	3%	1,867	28%
.8%	36%	5%	$280	1%	39,391	100%
2.4%	55%	8%	$80	.5%	50,000	100%
1.5%	41%	4.1%	$79.2	1.9%	19,888	82%



1993 Industry rank	Company	Total score	Peer points	Chief executive points	Management points	IS budget (millions)
PETROLEUM AND CHEMICALS						
1	Air Products and Chemicals, Inc.*	77,785	17,370	8,250	8,000	$51
6	Engelhard Corp.	76,670	16,000	8,250	8,610	$18.2
9	Oryx Energy Co.*	74,750	16,000	9,000	8,000	$26
6	Rohm & Haas Co.	74,745	16,000	8,250	8,790	$65
5	Unocal Corp.	74,325	16,000	8,250	8,700	$85
6	The B. F. Goodrich Co.*	72,690	16,000	6,000	6,000	$34
7	Vulcan Materials Co.*	72,500	16,000	6,000	8,000	$11
6	Sherwin-Williams Co.	71,870	16,000	6,000	8,580	$29.3
9	Amerada Hess Corp.*	70,725	16,000	8,000	8,000	$43
10	FMC Corp.	69,015	16,000	8,250	8,700	$100
	Industry average	73,508	16,137	7,425	8,338	$46.3
PHARMACEUTICALS, FOOD AND BEVERAGES						
1	Abbott Laboratories*	77,880	17,580	8,000	8,000	$170
6	Becton, Dickinson & Co.	75,910	16,000	8,250	8,700	$57.4
3	Hershey Foods Corp.*	74,285	16,000	7,500	8,000	$27.7
6	Kellogg Co.*	73,880	16,000	6,000	8,000	$48
5	Pet, Inc.*	73,505	16,000	8,250	8,000	$22.2
6	Hormel Foods Corp.*	72,205	16,000	6,000	8,000	$25.5
7	Merck & Co.	71,600	16,000	6,000	8,805	$200
6	Schering-Plough Corp.*	71,600	16,000	6,000	8,000	$67
9	The Quaker Oats Co.*	70,905	16,000	8,000	8,000	$71.3
10	Whitman Corp.	70,145	17,370	8,250	6,000	$11.9
	Industry average	73,192	16,295	6,825	8,151	$70.1
RETAILING AND WHOLESALING						
1	Winn-Dixie Stores, Inc.*	75,440	16,000	8,250	8,000	$98.8
2	Dillard Department Stores, Inc.*	73,415	16,000	6,000	8,000	$28.8
3	Carter Hawley Hale Stores, Inc.	72,975	16,000	6,000	8,775	$23.1
4	Albertson's, Inc.*	72,900	16,000	6,000	6,000	$101.7
5	JC Penney Co.	72,810	16,000	9,000	8,745	$176

Listings continue on the following page

*Estimates are from *Computerworld* sources and not the companies

How Will Your Organization Benefit From Sun?

1-800-426-5321, ext. 605.

Please send me more information about Sun systems, and how they can give me an advantage.

I Am A Sun™ SPARC® User:
01 ❑ Yes 02 ❑ No

My Industry Is:
25 ❑ Aerospace
27 ❑ Automotive
11 ❑ Education
28 ❑ Electronics
64 ❑ Financial
16 ❑ Government
07 ❑ Earth resources/oil and gas
19 ❑ Pharmaceutical/chemicals
34 ❑ Publishing
12 ❑ Retail/wholesale
39 ❑ Telecommunications
06 ❑ Transportation
09 ❑ Other _____

My Job Function Is:
28 ❑ Accounting/finance
01 ❑ Administration
27 ❑ Communications
22 ❑ Consulting
10 ❑ Education/training
06 ❑ Engineering
05 ❑ Manufacturing
02 ❑ Marketing/sales
23 ❑ MIS/IR
07 ❑ Operations
12 ❑ Purchasing
24 ❑ Research & development
20 ❑ Software development
00 ❑ Other _____

Please Include A Free World Cup Poster:
01 ❑ Yes 02 ❑ No

Name: _____

Company: _____ Title: _____

Address: _____

City: _____ State: _____ Zip code: _____

Country: _____ Telephone: _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 11313 BRIDGETON MO

POSTAGE WILL BE PAID BY ADDRESSEE

SUN MICROSYSTEMS, INC.
PO BOX 4491
BRIDGETON, MO 63044-9822



IS budget as % of revenue	% of IS budget for staff	% of IS budget for training	Processor market value (millions)	Processor market value as % of revenue	Total PCs and terminals	% of employees with PCs/terminals
1.6%	35%	1%	$10	4.6%	14,500	100%
1.8%	61%	2%	$.3	.6%	3,500	66%
2%	40%	1%	$14	1%	769	48%
2.2%	40%	5%	$35	1.1%	8,500	43%
1%	38%	3%	$21	.23%	10,000	68%
1.3%	44%	2%	$58	2.2%	6,000	44%
1%	37%	3%	$5	.5%	6,400	100%
.67%	45%	4%	$30	1.1%	17,846	100%
.7%	46.6%	3.4%	$159	.25%	9,500	90%
2.5%	40%	3%	$43	1%	11,000	43%
1.5%	42.7%	2.7%	$37.5	1.3%	8,802	70.2%
2.2%	53%	2%	$157	2%	48,000	100%
2.4%	52%	1.5%	$20	.9%	7,100	37%
.9%	48%	3%	$10	.3%	13,700	100%
.8%	48%	4%	$60	1%	10,000	56%
1.3%	40%	3%	$34.2	2%	4,800	65%
.9%	39%	2%	$17	.6%	8,300	100%
1.6%	51%	5%	$130	1.5%	20,000	52%
1.6%	40%	.3%	$33	.8%	10,000	47%
1.3%	57%	4%	$21.1	.4%	6,500	31%
.57%	49.6%	4.5%	$23.7	1%	7,000	50%
1.4%	47.8%	2.9%	$50.6	1.05%	13,540	64%
.9%	37%	5%	$70	.7%	90,000	83%
.6%	23.6%	1%	$50	1%	17,593	52%
1.1%	45%	2%	$75	.9%	5,000	41%
1%	38%	4%	$152.6	1.5%	70,000	99%
.9%	45%	1%	$45	2.8%	90,000	47%



1993 industry rank	Company	Total score	Peer points	Chief executive points	Management points	IS budget (millions)
RETAILING AND WHOLESALING						
6	Wal-Mart Stores, Inc.	70,745	17,640	6,000	8,700	$335.5
7	The Limited, Inc.*	70,025	16,000	6,000	6,000	$44.3
8	Food Lion, Inc.	68,685	16,000	6,000	8,805	$26.8
9	McDonald's Corp.	67,150	16,000	6,000	8,580	$70
10	The Home Depot, Inc.	66,100	16,000	6,000	6,000	$70
	Industry average	71,025	16,164	6,525	8,361	$97.7
TRANSPORTATION						
1	Alexander & Baldwin, Inc.*	78,075	16,000	7,500	6,000	$27.9
6	AMR Corp.	77,795	17,370	9,000	8,755	$1,004
5	Yellow Corp.	77,360	16,000	6,000	8,655	$41
6	Roadway Services, Inc.	77,160	16,000	9,000	8,685	$140.7
5	American President Cos.	76,295	16,000	6,000	8,685	$68.9
6	Federal Express Corp.	75,695	16,000	6,000	8,655	$360
7	Airborne Freight Corp.	75,675	17,310	8,250	8,640	$50
6	Union Pacific Corp.	75,145	17,340	6,000	8,745	$251
6	UAL Corp.	75,125	17,310	6,000	6,000	$331.1
10	Consolidated Freightways, Inc.	73,925	16,000	6,000	8,580	$89.6
	Industry average	76,225	16,533	7,575	8,540	$236.4
UTILITIES						
1	US West, Inc.*	77,250	17,340	8,250	8,000	$400
6	Duke Power Co.	76,995	16,000	8,250	8,565	$76.6
3	Carolina Power & Light Corp.	76,950	16,000	8,250	8,655	$80.5
4	MCI Communications Corp.	76,655	16,000	6,000	8,580	$667
5	SCECorp*	75,140	16,000	6,000	8,000	$135
6	GTE Corp.	74,590	16,000	6,000	8,565	$762.8
7	Northeast Utilities	73,605	16,000	6,000	8,760	$69.4
8	Southwestern Bell Corp.*	73,385	16,000	6,000	8,000	$305
5	FPL Group, Inc.*	71,135	16,000	6,000	8,505	$71.2
10	AT&T	70,050	17,610	6,000	8,745	$3,700
	Industry average	74,576	16,295	6,675	8,438	$626.8

*Estimates are from *Computerworld* sources and not the companies



IS budget as % of revenue	% of IS budget for staff	% of IS budget for training	Processor market value (millions)	Processor market value as % of revenue	Total PCs and terminals	% of employees with PCs/terminals
4%	35%	10%	$40	.2%	140,000	33%
.6%	37%	1%	$20	.3%	45,000	45%
.4%	20%	4%	$2	.1%	2,000	29%
1%	31%	1%	$12	.2%	4,500	25%
1%	36%	3%	$40	1%	5,000	72%
.8%	34.8%	3.2%	$50.7	.9%	38,909	53%
3.8%	36%	5%	$16	2.1%	8,700	100%
4%	39%	1%	$320	2.2%	139,570	100%
1.8%	54%	2%	$18.5	1%	4,700	100%
2.6%	38.7%	2.5%	$69.4	.7%	12,920	69%
2.8%	57%	1%	$6.3	.4%	5,223	115%
4.5%	48.8%	1%	$49.1	.6%	18,000	22%
3.4%	36%	1%	$9.2	.6%	10,600	68%
2.9%	47%	3%	$17	3%	19,857	100%
2.6%	19%	.5%	$18	.14%	2,480	76%
2.2%	53%	2%	$7	.2%	6,670	100%
3.1%	42.9%	1.9%	$55.1	1.1%	23,072	85%
3.9%	40%	5%	$50	.5%	60,000	94%
1.8%	44%	3.5%	$30.3	.7%	17,187	91%
2.9%	37%	6%	$28.5	1%	7,000	100%
6.3%	33%	4%	$400	3%	44,000	50%
1.7%	38%	3%	$56.7	.7%	11,000	64%
3.8%	21%	2%	$148	.7%	16,327	100%
2.2%	38%	5.3%	$93.3	2.9%	6,500	70%
3.1%	45%	4%	$10.5	1%	60,000	100%
1.4%	20.7%	1%	$160	3%	14,500	100%
5.7%	40%	5%	$675	1%	320,000	100%
3.3%	35.7%	3.9%	$165	1.5%	55,681.4	87%



Help end the class struggle.

Here's your chance to train the next generation of knowledge workers before they show up for work.

Donate your unused computers, software, and peripherals directly to your local school.

Or contact Computers for Classrooms at one of the numbers below, and we'll direct your donations for you.

Either way, your generosity will pay off in gigabytes.

COMPUTERS FOR CLASSROOMS

Because instead of tossing your equipment out, or selling it for a few cents on the dollar, you'll be providing our classrooms with the most powerful teaching aid since teachers.

And getting a tax deduction in the bargain.

So donate the best—and most—equipment you can afford. When you do, you'll be helping a whole new class of people to succeed.

Gifts In Kind America
800-862-GIFT

The East-West Education Development Foundation
617-542-1234

The National Cristina Foundation
800-CRISTINA

Buddy-Up with Education
800-53-BUDDY

COMPUTERWORLD

The 1993 Premier 100

A list of Premier 100 *companies, top IS executives and page references.*
Page numbers refer to the first page of the article(s) in which the company is mentioned.

3M Co., David P. Drew, V.P., Information Technology, **52**

Abbott Laboratories, Kenneth Farmer, V.P., MIS and Administration, **48, 54**

Air Products and Chemicals, Inc., Peter W.C. Mather, V.P., IS, **48, 54**

Airborne Freight Corp., David A. Billings, V.P., Information and Technology Systems, **48, 56**

Albertson's, Inc., Patrick S. Steele, Group V.P., MIS, **18, 50**

Alexander & Baldwin, Inc., Don Fujimoto, Director, MIS, **56**

Allied Signal, Inc., Donald Fleming, Corporate Director, IS, **50**

Amerada Hess Corp., Phil Brougham, Manager, MIS, Refining and Marketing, **50**

American Express Co., Joseph A. Caruso III, Director, Corporate Systems and Technology, **52**

American Presidents Cos., James S. Marston, CIO, **37, 50**

AMR Corp., Max D. Hopper, Senior V.P., IS, **18, 48, 50**

AT&T, Ron J. Ponder, Senior V.P. and CIO, **56**

Banc One Corp., Robert Barrett, President, Services Corp., **50**

Bandag, Inc., Chuck Vesey, V.P. and Corporate Controller, **52**

Bankers Trust New York Corp., Carmine Vona, Managing Director, IS, **18, 52**

Becton, Dickinson & Co., Roland "Chip" Cyr, V.P., Information Technology, **10, 54**

The B. F. Goodrich Co., Carol L. Moore, Executive Director, MIS and Administrative Services, **54**

The Boeing Co., John D. Warner, President, Computer Services, **36, 48, 50**

Browning-Ferris Industries, Inc., Sam T. Baty, V.P., IS, **50**

Carolina Power & Light Corp., R. Thomas Dwyer, V.P., IS, **13, 50**

Carter Hawley Hale Stores, Inc., Robert M. Menar, Senior V.P., IS, **26, 50**

Caterpillar, Inc., Robert P. Hinds, Director, Corporate IS, **52**

Chemical Banking Corp., Denis O'Leary, CIO, **50**

Cigna Corp., J. Raymond Caron, President, Systems, **48, 52**

Cone Mills Corp., Paul Vetter, Director, IS, **52**

Consolidated Freightways, Inc., Phil Seeley, V.P., Administration and Technology, **56**

Crestar Financial Corp., William M. Ginther, Executive V.P., Technology and IS, **52**

Cummins Engine Co., Chip Gulden, V.P., Information Processing and Technology, **52**

Deere & Co., Paul Ohman, V.P., Information Technology, **29, 48, 50**

Dibrell Brothers, Inc., Lewis R. Handy, V.P. and Director, MIS, **52**

Dillard Department Stores, Inc., Malcolm Ritchie, V.P., IS, **50**

Duke Power Co., Jimmy R. Hicks, V.P., Information Technology Services, **4, 29, 50**

The Dun & Bradstreet Corp., Garry P. Hawxhurst, Assistant V.P., Corporate Systems, **50**

Emerson Electric Co., Lamar Rieves, V.P., IS, **50**

Engelhard Corp., Stephen I. Pook, V.P., IS, **26, 50**

Federal Express Corp., Dennis H. Jones, Senior V.P. and CIO, **4, 48, 50**

FMC Corp., Dan Irwin, V.P., Technology, Manufacturing and IS, **10, 50**

Food Lion, Inc., A. Edward Benner, V.P., MIS, **56**

FPL Group, Inc., William O'Brien, V.P., Information Management, **50**

Gencorp, Inc., Allen R. Wilkie, Director, IS, **18, 50**

General Dynamics Corp., Asaph H. Hall, Corporate V.P., IS and Administrative Services, **50**

Great American Management & Investment, Inc., Michael Corcoran, Director, Central Computer Services, **52**

Grumman Corp., William D. Rizzardi, CIO and V.P., Information Management, **50**

GTE Corp., Dennis J. Murphy, Acting V.P., Computer Services, **50**

Harley-Davidson, Inc., Richard L. Kolbe, Director, MIS, **4, 52**

Harnischfeger Industries, Inc., Les Singer, Director, Corporate IS, **52**

Helene Curtis Industries, Inc., Thomas J. Gildea, V.P., Business IS, **26, 50**

Hershey Foods Corp., Bruce Diessenbach, Director, MIS, **50**

The Home Depot, Inc., W. Andrew McKenna, Senior V.P., IS, **38, 50**

Hon Industries, Inc., Gail Kuffman, Manager, IS, **50**

Hormel Foods Corp., Daniel J. Darveaux, Director, Data Processing, **50**

International Flavors and Fragrances, Inc., Wim J. Van Berkel, V.P., U.S. and Corporate Director, Information Technology, **50**

JC Penney Co., David Evans, V.P. and Director, IS, **26, 48, 54**

Kellogg Co., Jay W. Shreiner, V.P., IS, **50**

Kellwood Co., Paul M. Rivard, Director, MIS, **37, 50**

The Limited, Inc., Tom Beauchamp, V.P., MIS, **50**

Marriott Corp., John Murray, Senior V.P., IS and Technology Division, **50**

Martin Marietta Corp., Raymond S. Wiltshire, V.P., Computer-Aided Productivity, **48, 50**

McDonald's Corp., Carl Dill, V.P., IS, **50**

McDonnell Douglas Corp., Leonard J. Deney, V.P., IS, **50**

MCI Communications Corp., James Hoffmann, Senior V.P., Systems Engineering, **37, 50**

Mellon Bank Corp., Allan P. Woods, Executive V.P., **36, 50**

Merck & Co., Charles Popper, V.P., Corporate Computer Resources, **50**

Navistar International Corp., Skip Stout, V.P., Information Organization, **52**

Nortek, Inc., Mark Rafferty, Systems Administrator, **38, 52**

Northeast Utilities, Tod O. Dixna, V.P., Information Resources, **50**

Northrop Corp., Herbert W. Anderson, V.P. and General Manager, IS Center, **13, 38, 50**

Oryx Energy Co., William M. Fore, Director, Information Management, **18, 50**

Outboard Marine Corp., Harry R. Adams, Director, Systems and Data Processors, **36, 52**

Pet, Inc., Robert Drury, V.P., MIS, **18, 38, 50**

Phelps Dodge Corp., Dudley A. McRae, Director, Corporate IS, **4, 52**

Polaroid Corp., Tom Hennigan, Director, Worldwide Systems Management Division, **52**

Primerica Corp., Richard E. Morrison, Senior V.P. and CIO, **52**

Prudential Insurance Co., Kirk Bent, V.P., MIS, **56**

The Quaker Oats Co., James Le Gere, V.P., IS, **50**

Raychem Corp., John McCrillis, Director, Information Technology U.S., **52**

Raytheon Co., Robert Sexton, Director, IS, **50**

Reader's Digest Association, Inc., Kenneth A. Nelson, V.P., MIS, **50**

Roadway Services, Inc., Jonathan T. Pavloff, V.P., Corporate Planning, **38, 56**

Rohm & Haas Co., David Stitely, CIO, **38, 54**

Rubbermaid, Inc., Michael Naylor, Senior V.P., Technology and Environment, **38, 52**

SCECorp, David Tommela, Manager, Information Technology, **48, 50**

Schering-Plough Corp., Robert S. Lyons, V.P., Corporate IS, **54**

Sherwin-Williams Co., Wayne P. Gacnik, Corporate Director, MIS, **50**

Southwestern Bell Corp., Richard C. Dietz, V.P., IS, **50**

Tecumseh Products Co., John Ford, Corporate Manager, IS Development, **52**

Textron, Inc., Cecil Labhart, V.P., IS, **29, 50**

The Travelers, Lawrence E. Bacon, Senior V.P., IS, **13, 38, 48, 56**

UAL Corp., Rono Dutta, V.P., MIS, **13, 56**

Union Pacific Corp., L. Merill Bryan Jr., President and CEO, UP Technologies, **48, 56**

Unocal Corp., Paul R. Jones III, Director, Corporate IS, **26, 48, 50**

US West, Inc., Will Smith, Senior V.P., Research and Development, **18, 48, 50**

Vulcan Materials Co., Harry L. Nelson, Director, IS, **50**

Wal-Mart Stores, Inc., Bob L. Martin, Executive V.P., **4, 48, 56**

West Point-Pepperell, Inc., Dan Laidlaw, V.P., MIS, **52**

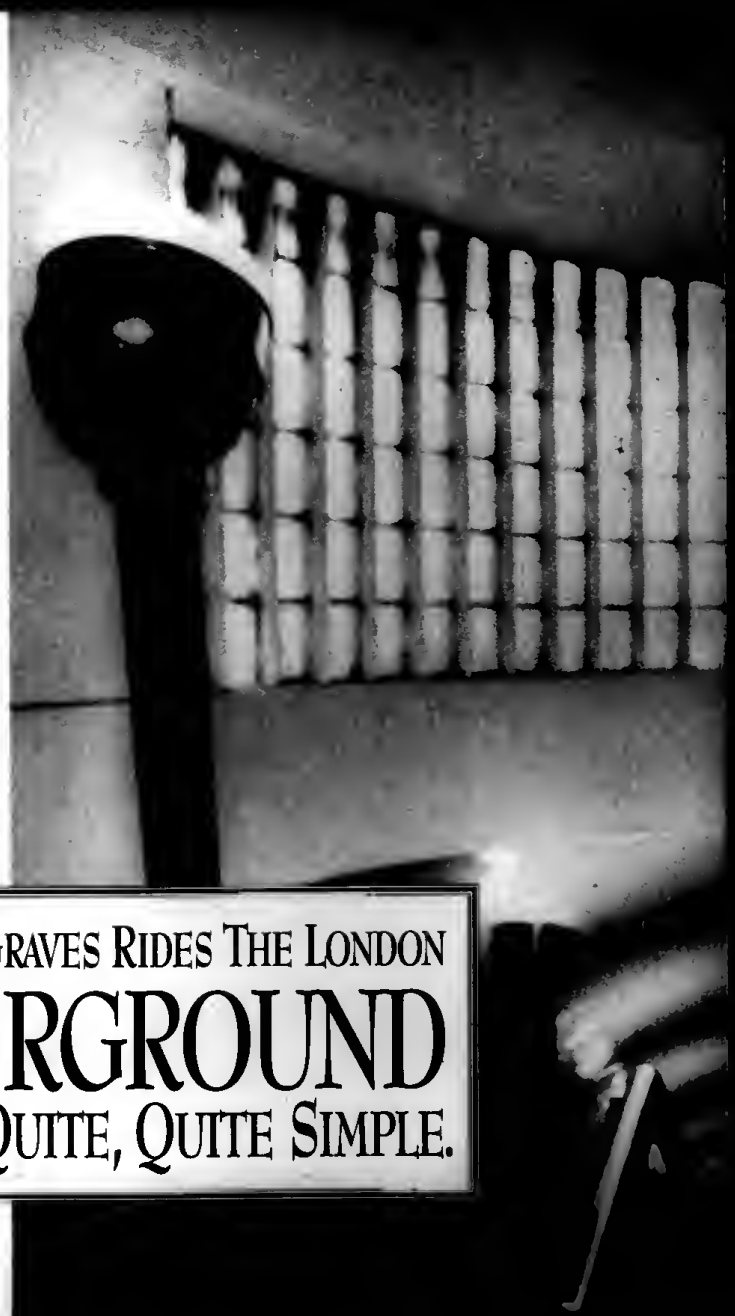
Westvaco Corp., Rodney C. Elser, V.P., Data Processing, **52**

Whitman Corp., Daniel P. Dvorak, V.P., MIS, **10, 50**

Willamette Industries, Inc., Cam Henderson, Corporate IS Manager, **52**

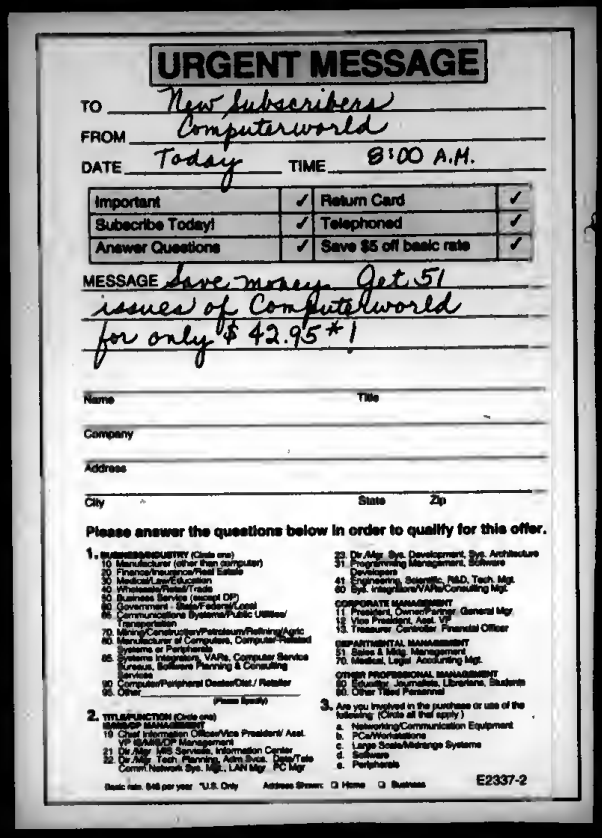
Winn-Dixie Stores, Inc., C. Ray Raulerson, V.P., IS, **54**

Yellow Corp., Bill Martin, Acting President, Yellow Technology Services, **50**



WHY ROBERT GRAVES RIDES THE LONDON UNDERGROUND IS REALLY QUITE, QUITE SIMPLE.

Like most Londoners, Robert Graves lives comfortably in a world of tradition, and a world of innovation. ◆ When he rides the world's oldest subway, he is also depending upon the world's most advanced form of computing. ◆ London Underground officials find it a natural combination, too. That's why they turned to Sun when they wanted an innovative way to schedule their historic system. ◆ Using powerful Sun computers, officials can compute exactly where each train should be, on which track, at any given minute of the day. They're able to work quickly, sharing information back



URGENT MESSAGE

TO New Subscribers

FROM Computerworld

DATE Today TIME 8:00 A.M.

Important	✓	Return Card	✓
Subscribe Today!	✓	Telephoned	✓
Answer Questions	✓	Save $5 off basic rate	✓

MESSAGE Save money. Get 51 issues of Computerworld for only $42.95 #1

Name Title

Company

Address

City State Zip

Please answer the questions below in order to qualify for this offer.

1. BUSINESS/INDUSTRY (Circle one)
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medical/Law/Education
40 Wholesale/Retail/Trade
50 Business Service (except DP)
60 Government - State/Federal/Local
70 Communications Systems/Public Utilities/Transportation
75 Mining/Construction/Petroleum/Refining/Agric.
80 Manufacturer of Computers, Computer-Related Systems or Peripherals
85 Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90 Computer/Peripheral Dealer/Dist. / Retailer
99 Other _____ (Please Specify)

2. TITLE/FUNCTION (Circle one)
CORPORATE MANAGEMENT
10 Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
11 Dir./Mgr. MIS Services, Information Center
12 Dir./Mgr. Tech. Planning, Adm./Prod. Data/Tele Comm/Network Sys. Mgt., LAN Mgr. PC Mgr.
20 Dir./Mgr. Sys. Development, Sys. Architecture
31 Programming Management, Software Developers
41 Engineering, Scientific, R&D, Tech. Mgt.
60 Syst. Integrators/VARs/Consulting Mgr.

CORPORATE MANAGEMENT
11 President, Owner/Partner, General Mgr.
12 Vice President, Asst. VP
13 Treasurer, Controller, Financial Officer

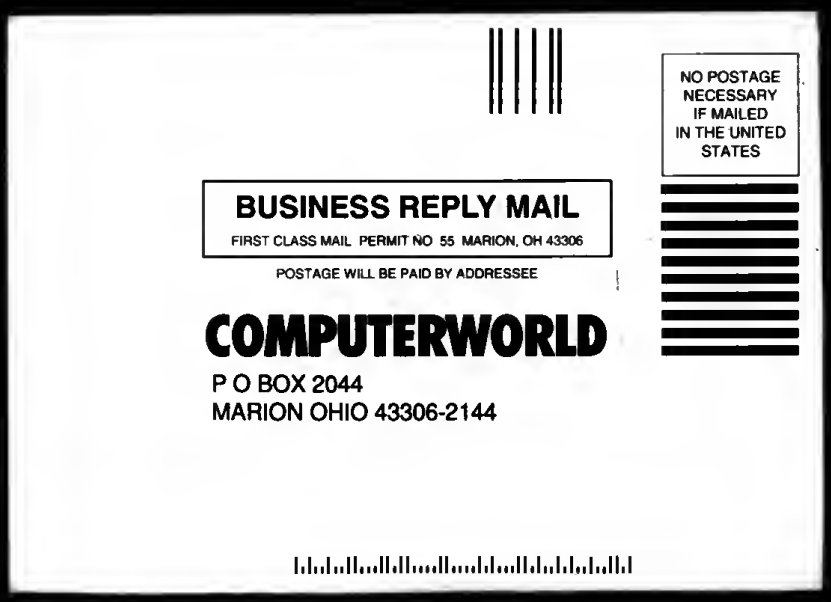
DEPARTMENTAL MANAGEMENT
51 Sales & Mktg. Management
70 Medical, Legal, Acct/Lnrtng Mgt.

OTHER PROFESSIONAL MANAGEMENT
80 Educator, Journalist, Librarians, Students
90 Other Titled Personnel

3. Are you involved in the purchase or use of the following (Circle all that apply)
a. Networking/Communication Equipment
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

Basic rate: $48 per year *U.S. Only Address Shown: ☐ Home ☐ Business

E2337-2



NO POSTAGE
NECESSARY
IF MAILED
IN THE UNITED
STATES

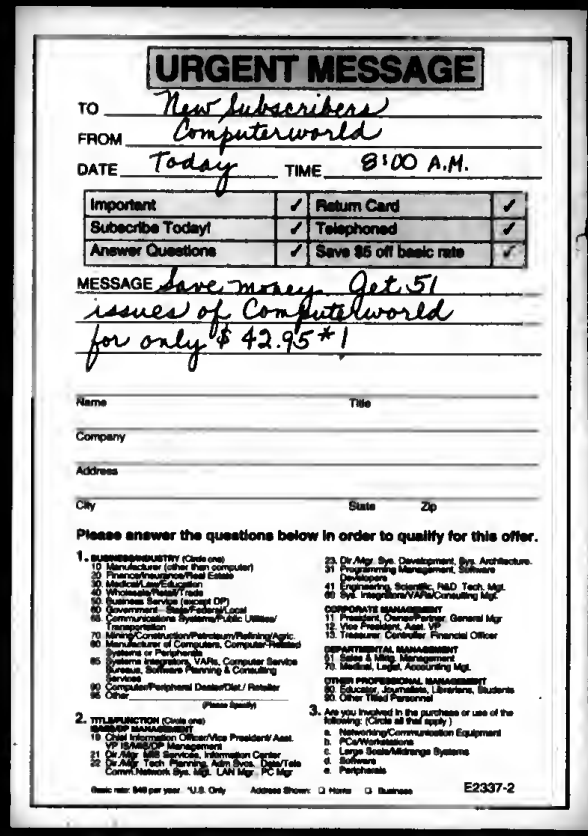
BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P O BOX 2044
MARION OHIO 43306-2144



URGENT MESSAGE

TO New Subscribers

FROM Computerworld

DATE Today TIME 8:00 A.M.

Important	✓	Return Card	✓
Subscribe Today!	✓	Telephoned	✓
Answer Questions	✓	Save $5 off basic rate	✓

MESSAGE Save money. Get 51 issues of Computerworld for only $42.95*1

Name Title

Company

Address

City State Zip

Please answer the questions below in order to qualify for this offer.

1. BUSINESS/INDUSTRY (Circle one)
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medical/Law/Education
40 Wholesale/Retail/Trade
50 Business Service (except DP)
60 Government - State/Federal/Local
70 Communications Systems/Public Utilities/Transportation
73 Mining/Construction/Petroleum/Refining/Agric.
80 Manufacturer of Computers, Computer-Related Systems or Peripherals
85 Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
90 Computer/Peripheral Dealer/Dist./ Retailer
99 Other (Please Specify)

2. TITLE/FUNCTION (Circle one)
CORPORATE MANAGEMENT
10 Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
21 Dir./Mgr. MIS Services, Information Center
22 Dir./Mgr. Tech. Planning, Adm Svcs., Data/Tele Comm/Network Sys. Mgr., LAN Mgr., PC Mgr.
23 Dir./Mgr. Sys. Development, Sys. Architecture, Programming Management, Software Developers
41 Engineering, Scientific, R&D, Tech. Mgt.
69 SYS. Integrators/VARs/Consulting Mgt.

CORPORATE MANAGEMENT
11 President, Owner/Partner, General Mgr
12 Vice President, Asst. VP
15 Treasurer, Controller, Financial Officer

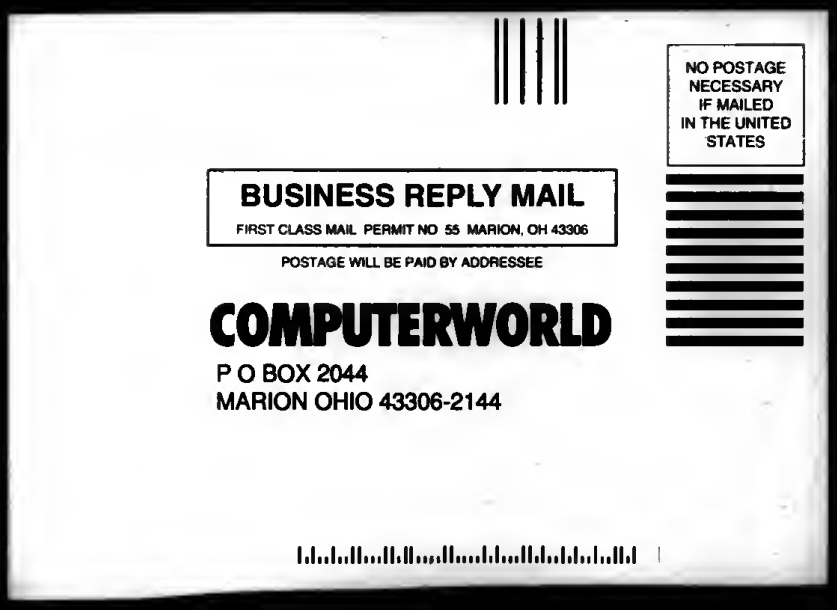
DEPARTMENTAL MANAGEMENT
31 Sales & Mktg. Management
70 Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
80 Educator, Journalists, Librarians, Students
90 Other Titled Personnel

3. Are you involved in the purchase or use of the following: (Circle all that apply)
a. Networking/Communication Equipment
b. PCs/Workstations
c. Large Scale/Midrange Systems
d. Software
e. Peripherals

*Basic rate: $48 per year *U.S. Only Address Shown: ☐ Home ☐ Business

E2337-2



NO POSTAGE
NECESSARY
IF MAILED
IN THE UNITED
STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P O BOX 2044
MARION OHIO 43306-2144



and forth along a network, creating schedules that precisely space the 478 trains along 254 miles of track. ◆ So frequent and so dependable are the trains that the public need not consult a printed schedule. The trains will just be there when they're needed. ◆ Which is just what Robert Graves and the other 800 million riders have come to expect from their historic Underground. ◆ It is, after all, twentieth-century London. ◆ More than 135,000 organizations are using Sun systems, powered by the SPARC® chip and the Solaris® operating environment, to gain a competitive advantage. The London Underground is just one. To learn how you can benefit, call 1-800-426-5321, ext. 605.

Sun

Sun Microsystems Computer Corporation
A Sun Microsystems, Inc Business
© 1994 Sun Microsystems, Inc.

The Network Is The Computer™



Sun Microsystems Computer Corporation
A Sun Microsystems, Inc. Business

The Network Is The Computer

© 1993 Sun Microsystems, Inc. Sun, Sun Microsystems, the Sun logo, Solaris and The Network Is The Computer are trademarks or registered trademarks of Sun Microsystems, Inc. SPARC is a registered trademark of SPARC International, Inc. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc. All other products or service names mentioned herein are trademarks or registered trademarks of their respective owners.

When America's largest financial institutions develop new Offloading solutions, where do they put their money?

When you have a vested interest in software development, there's no better asset than Micro Focus.

In fact, eight of the top ten companies in *Computerworld's Premier 100,** the country's most efficient users of computer technology, develop applications with Micro Focus products.

As part of their global IT strategy, Wall Street's financial services organizations have implemented the Micro Focus Offloading Solution. From developing a workstation programmer platform to exploit the productivity benefits of a worldwide LAN network, to offloading mainframe batch, CICS,™ IMS™ and DB2® COBOL applications to networked PCs, the results are consistent: dramatically increased developer productivity, major cost savings and more efficient maintenance.

But then Micro Focus solutions have been proven in the most demanding environments. From offloading mainframe development, downsizing and client/server computing, to cross-platform and PC-based applications.

So, today, when you see the world's leading corporations turning software development into productivity, chances are Micro Focus is in the picture. For more information on putting the Micro Focus Offloading Solution to work for you, call **800-872-6265.**

MICRO FOCUS®

Micro Focus Inc. 2465 East Bayshore Road, Palo Alto, CA 94303 Tel. (415) 856 4161

*Computerworld Premier 100 Survey, September 14, 1992. Micro Focus is a registered trademark of Micro Focus, Inc. All other trademarks are property of their respective companies.

GSA Contract Number GS00K93AGS6403.

Why on Earth is a printer company thinking about the paperless workplace?

Because, at Pennant Systems, we've redefined printing to mean much more than making impressions on a page. Printing is the *presentation* of information anywhere you want it, and in whatever form you need it.

Pennant, an IBM Company, offers a full range of advanced printers and software systems and services that help manage the way information flows through your entire organization.

If you have printers and display systems in place, even many different brands, we can integrate them efficiently as well.

IN THE FUTURE, PAPER WILL ONLY BE STORED IN TWO PLACES.



© 1993 IBM Corporation. All rights reserved.

That's why Pennant is not just a printer company. You see, we are a *presentation* company.

Printing hard copies may not be as necessary in the future as it is now, which is good news for forests. But getting information presented to you instantly, and in any form is already an essential way to do business.

A Pennant representative would be more than happy to talk to you about your company's information presentation needs. Save a little paper and call us at 1-800 PENNANT for information on our printers, software, maintenance, and other services.

Your company, your customers, and your forests will thank you.



Redefining Printing.™

PENNANT

An IBM Company

Private lines jettisoned in favor of public networks

By Joanie M. Wexler
and Lynda Radosevich

The corporate migration from private to public data networking is off and running, thanks largely to frame relay.

Companies such as Dialog Information Services and Seafirst Bank in Seattle are taking the plunge with plans to entirely phase out their private networks in favor of public services. Other firms are halting the expansion of existing private lines and instead are growing their networks with public nodes.

The reasons for such moves, which often depend on the depreciation status of a company's equipment and breadth of its connectivity needs, include cost savings as coverage requirements widen and the ability to experiment with new technologies without making hefty equipment investments.

For example, coverage is a major impetus for Palo Alto, Calif.-based Dialog, which said last week it is dumping its private 55-node X.25 network for BT North America, Inc. frame-relay services. According to Dan Pritchard, director of data communications and systems programming, Dialog is looking to widen its traditional school and library customer base. This requires the extensive network connectivity afforded by broad-reaching public networks, he said.

Generally, "Public services can provide interconnection opportunities throughout the world where doing that independently can be prohibitively expensive," pointed out Dugal Easton, president of the Tele-Communications Association trade group.

Pritchard said he expects Dialog to save "millions" in capital investments and personnel costs within a few years by using public services.

Meanwhile, Seafirst Bank is phasing out its 45-node StrataCom, Inc. dedicated T1 network in favor of public US West and GTE Corp. frame-relay services, according to William Anderson, senior vice president and operational services manager.

Staying current

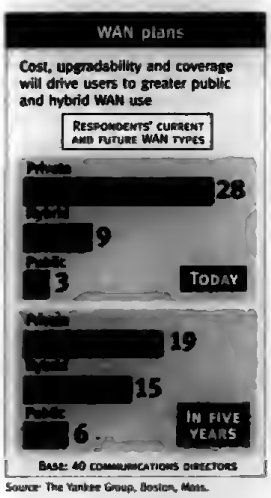
The reason is "to avoid technical obsolescence, capital infusion and recurring staff education every time we need to change" the network to accommodate new technologies, Anderson said.

Another StrataCom shop, Convex Computer Corp., has decided to stop expanding its private network. It recently replaced nine point-to-point private lines with public frame-relay services from WilTel to save money, said Coyne Gibson, a network systems architect.

StrataCom's equipment runs on customer premises equipment and in public carrier backbones such as those from WilTel, BT North America and AT&T. It can run as a standard T1 multiplexer or with an optional frame-relay interface.

The public/private straddling of the StrataCom gear could present StrataCom private network customers with some security where interoperability and service consistency is a concern, analysts noted.

StrataCom said 65% to 70% of its business today remains in private user networks, but it expects that ratio to shift to a 50/50 split in the next few years.



Source: The Yankee Group, Boston, Mass.

"Private network growth has been slow over the last two years," said Alex Mendez, StrataCom's vice president of marketing. "People are intrigued by the cost savings" of frame relay, he said.

Some companies are ready to rid themselves entirely of private networks. Manulife Financial in Toronto uses all public services except for a private network needed to link U.S. and Canadian sites.

"I wouldn't see us using private networks in the future," said Mike Innell, assistant vice president of information technology development. "More sophistication is needed [on staff] for private networks, and telecommunications is not our business."

The current business climate "has reduced corporate manpower for maintaining networks, and this means a reduction of available people dedicated to telecommunications," Easton added.

Retailer stalled

CONTINUED FROM COVER 1

technology out of a central information systems shop to the store level, said Steve Johnson, an analyst at Andersen Consulting.

Once the system is installed, Nordstrom should see payback almost immediately, Johnson said. "Technology like this will help them make quick decisions, which is important in the zero-sum consumerism game," Johnson said. "If you want to grow sales, you have to do it at the expense of competitors."

Major hardware investment

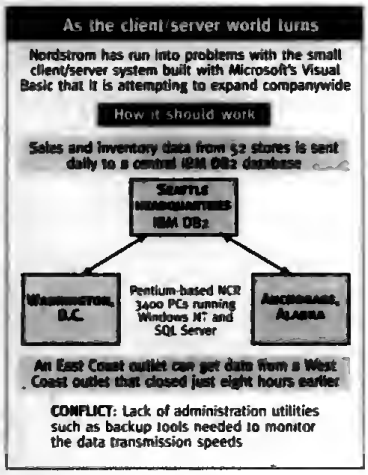
Benton declined to say how much the project cost. However, the company has spent $4 million on hardware alone, according to NCR Corp., which supplied servers, PCs and networking gear.

Benton hedged on setting a preholiday deadline for getting the system installed at all sites. But he acknowledged that "we see this system as having high potential payback, so we'll get as much done before Christmas as possible."

The merchandising application will eventually give in-store buyers local access to daily sales information residing on a DB2 mainframe here for the entire 52-shop chain (see chart).

Buyers will be able to make faster, more informed decisions about ordering goods and setting prices. If $50 orange sweaters are gathering dust, for example, a buyer can cancel pending orders or slash prices.

However, problems have surfaced in getting NT to talk smoothly and quickly to DB2, where sales, inventory and pricing data collected from all stores nationwide resides.



Specifically, Microsoft does not support direct connections between SQL Server for NT and DB2. Third-party gateways are needed, but Nordstrom said it is uncertain whether it wants to spend more money on the gateways and whether the products will be robust enough to handle the heavy batch processing the retailer has in mind, Benton said.

Plus, large batch requests bogged down the client/server system during pilot tests in Oregon.

"We have to work out [on-line transaction processing] issues before we can take it any further," said Gordon Ridgeway, manager of data resources.

Also problematic are the gaping holes where client/server administration tools should be. Nordstrom cannot reproduce the 90%-plus uptime users have come to expect from the mainframe, Benton said.

Data backups are nettlesome, too, because no one utility completes the task. "You go through a series of steps that you never had to think about on the mainframe," he said.

Decision time

Still, Nordstrom finds itself at a crossroad: wait for Microsoft to build administration products and a gateway between DB2 and NT or buy third-party tools, of which precious few are suitable.

"Those guys don't have what we need," Ridgeway said. "They're waiting on the sidelines with the rest of the world until NT is really out there before they jump in."

Microsoft recommended gateways from either Rochester Software, Inc. or Micro Decisionware, Inc.

Open Database Connectivity interfaces are also an option, said Daniel Small, Microsoft's SQL product manager.

NT and SQL Server contain efficient administration and data access tools, Small contended. For example, SQL Object Manager builds database tables and generates triggers, he said.

The Oregon trial transferred about one-fourth the total volume of data expected once the entire company is brought on-line. Microsoft and NCR are not to blame for Nordstrom's difficulties, Benton said. Setbacks are a function of using unproven technology, he added.

The company chose NT in part because Microsoft vowed to make it a powerhouse client/server operating system, Benton said. Promised central administration of even far-flung distributed systems also convinced Nordstrom.

"That's their stated direction," Benton said. "We've never worked with Microsoft before, so we'll just wait and see."

Poor man's approach

It is not as if Nordstrom lacks client/server experience. The store's foray into the field was a small merchandising application two years ago. "It was a poor man's client/server, really, but it opened our eyes about what you can do with the technology," said Gordon Ridgeway, manager of data resources.

The first iteration of that application was a PC-based screen-scraper type of program that plucked data off an IBM mainframe and ran atop an electronic-mail package. Three updates later, the system runs on a local-area network with hooks into relational databases.

—Kim S. Nash



Break Down the Barriers Between People and the Information They Need

With the SAS® System— The World's Leading Information Delivery System.

A lot of obstacles stand between your organization's two most important assets: *people* and the *information* they need to make better decisions. With the SAS System, you can deliver the right information to the right people at the right time. Every time. And you can break down all the barriers created by...

Diverse Data Sources

The SAS System turns your organization's "islands of information" into generalized resources available to any user or application—no matter where or how data are stored, from popular databases to remote external files.

Diverse Applications

The applications that drive your enterprise are fully integrated in the SAS System—everything from EIS and decision support to financial analysis and reporting to quality management. This comprehensive approach eliminates the need for single-shot software solutions that have made a patchwork quilt of your applications strategy.

Diverse Client Needs

The specific needs and experience level of every client—from new computer users to seasoned pros—are met through personalized interfaces. Take advantage of icon-based executive information systems, point-and-click menus for business analysts, an object-oriented applications development environment, or a full-screen display environment just for programmers.

Diverse Computing Platforms

The SAS System maximizes the effective use of your entire computing mix—from PCs and workstations to minicomputers and mainframes. You'll have true hardware independence—without sacrificing your ability to exploit the particular advantages of specific environments. Plus the ability to implement cooperative processing by segmenting applications any way you choose.

For your free video introduction to the SAS System, give your Software Sales Account Manager a call today at 919-677-8200. Also ask for details about the free SAS System Executive Briefing—coming soon in your area.

SAS®

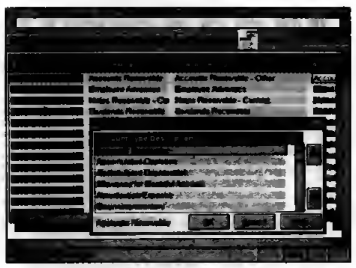
SAS Institute Inc.
Software Sales Division
SAS Campus Drive ☐ Cary, NC 27513
Phone 919-677-8200 ☐ Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc.
Copyright © 1992 by SAS Institute Inc. Printed in the USA.

If you're sitting around waiting for Dun & Bradstreet Software to deliver real client-server financial solutions,

Today, while mainframe software companies are scrambling to convert their old packages to something that they can call client-server, there's one real client-server financial solution that's already up and running all over the world.

It's called SeQueL to Platinum™, and it's the only solution designed to really work with the technology.



With SeQueL to Platinum, what you see is what you get.

©1993, Platinum Software Corp. All rights reserved. SeQueL to Platinum is a trademark and Platinum is a registered trademark of Platinum Software Corporation. Other company and product names may be trademarks of the respective companies with which they are associated.

you might need this.

It was created to take advantage of Sybase, so it's incredibly powerful. It has all the security of the best mainframe programs, plus all the ease of Windows. It empowers your people with access to the financial information they need, when they need it.

What's more, it's totally scalable, so it can grow and change as rapidly as you do. Which is one reason it's been selected by major oil companies, pharmaceuticals and Wall Street firms. And it comes from Platinum Software, the industry leader, with customers all over the world.

For more information about how a real client-server solution can work for your company, just call 1 (800) 414-7878. Or better yet, call for a demo of SeQueL to Platinum, today.

SYBASE open solutions premier partner

PLATINUM®
SOFTWARE CORPORATION

The unforgiven

You could probably denude the Muir Woods with the number of stories that have been written about linking information systems strategies to corporate goals.

But sometimes the best lessons on this subject come through other means — like the U.S. mail. Here's a "how not-to" lesson I learned.

A few months back I cut up a credit card I'd had for 12 years. The card company had affectionately referred to me as a "member" and had even printed my longevity as a member in its "club" on my card.

Anyway, for 12 years I charged various items and paid my bills. In return, the company stuffed into my billing envelopes all sorts of advertisements, which I immediately pitched. That was a prime benefit of my membership, along with the junk mail I received from other vendors that no doubt purchased the card company's list. But I got little else.



So when better credit card deals came along, such as a card that gave me frequent flier miles for each dollar spent, I canceled my "membership." Boy, did the club get busy servicing me then! I got letters from the president imploring me to rejoin. Requests to fill out (on my own good time) surveys detailing why I left the club. Requests to call them and discuss how they could do a better job. In short, there simply wasn't enough I could do for them. *For them!* Hey, I'm the damn customer. Maybe if you had paid attention to *me*, you'd still have me as a client.

Just think of the wealth of data they had about me and how they could have converted that to real information on how to serve me better. For example, I travel a great deal — 100,000+ miles per year — and charge every cent along the way. Someone else used that information to lure me to their card.

Back to the club. They knew where I traveled and how often. What airline I prefer. Where I like to stay. They could easily have inferred my dining habits. (I eat at lots of places that have the word "sea" in their names.) Or the cars I rent and what agency I use. They could see I do a great deal of catalog shopping. That I make phone calls from airplanes. That I buy lots of things for kids. What publications I subscribe to. What charities I favor. That my bills get huge around Christmas. That I pay my bills like clockwork.

Oh, what they knew about me! Or did they? Maybe it was just data floating aimlessly in some computer system, never to be harnessed for executives who could then custom-design services and perks for me.

I get the sense too many IS managers relegate such strategic thinking to non-IS executives. What a shame. For isn't IS closest to the data? Why didn't the club's IS group demonstrate the treasure trove of information senior executives could have had at their disposal?

They've lost one customer. And if the reports are true, they've been losing lots of them recently. This is one example that drives to the heart of the promise and potential of IS — and to its failure.

Bill Laberis

Bill Laberis, *Editor in chief*



Essence of quality

Ben Rothke's column "What's excellence got to do with it?" [CW, Aug. 2] displays a simplistic and ultimately inaccurate perception of market forces.

Contrary to Rothke's suggestion that "making the best operating system was never Job 1 at Microsoft," DOS and Windows do a far better job of getting PCs to solve real-world computing problems than any of the alternatives.

Quality is rarely a fixed, measurable entity. But, like pornography, people know it when they see it, and the computer marketplace, like many others, generally moves in that direction.

Mr. Rothke, forget the apples-and-oranges comparisons and (re)read Robert M. Pirsig's *Zen and the Art of Motorcycle Maintenance*, if you want to get a better handle on the true essence of quality.

Steven Salemi
Santa Fe, N.M.

The cost of 'coding'

It was very disappointing to read Joanne Kelleher's editorial [CW, July 19].

"Quick coding" is the Achilles' heel of data processing and is the dirtiest of the dirty. It has cost U.S. business and government billions, perhaps trillions of dollars from the first programs written to today.

To tout "quick coding" at this stage is to do a serious disservice to data processing. There is an absolute inverse correlation between "quick coding" and quality programming. When "quick coding" is given priority over clearly understandable coding, they become mutually exclusive.

Jerry Sitner
New York

Security leaks

In regard to "Whither wireless security" [CW, Aug. 16], it is quite easy to read data right from computers and terminals whether it is broadcast or not.

While it certainly would be beneficial to encrypt all data that is broadcast, don't think that action secures systems.

It would be more cost-effective to ensure that users don't post passwords on their terminals or throw printouts with confidential data in their trash cans.

One major company secured its computing systems but overlooked the fact that its engineers discussed all the secret projects on their CB radios as they rode to work in the morning. Friday night at local watering holes were also major exposures as they discussed the week's events in ever louder voices as they unwound with their favorite beverages.

William B. Adams
Springfield, Va.

Problem addressed

Contrary to the impression conveyed by "Security lapse bedevils users of SQL Server" [CW, Aug. 2], there is no lapse in SQL Server security that reduces safety for data. Rather, the problem described is one of management: the difficulty of administering multiple servers as needs expand beyond workgroup and departmental use. This issue is not specific to SQL Server — virtually all our competitors are also affected by this.

In our current suite of products for the Windows NT operating system we have tackled this problem directly by building specific enhancements into SQL Server to ease the administration and management of large-scale client/server networks.

Microsoft SQL Server continues to offer compatibility with the Sybase security model. However, we have also enhanced SQL Server specifically to meet the kinds of requirements discussed in the article. SQL Server now directly integrates with network security — the first major DBMS to do so.

I spent time with the writer explaining these enhancements in our product, but they were not discussed in the story. This is unfortunate because the reader is left with a very misleading impression.

Gary Voth
Senior product manager
Microsoft Corp.
Redmond, Wash.



■ COMPUTERWORLD WELCOMES COMMENTS FROM ITS READERS. LETTERS MAY BE EDITED FOR BREVITY AND CLARITY AND SHOULD BE ADDRESSED TO BILL LABERIS, EDITOR IN CHIEF, COMPUTERWORLD, P.O. BOX 9171, 375 COCHITUATE ROAD, FRAMINGHAM, MASS. 01701. FAX NUMBER: (508) 875-8931; MCI MAIL: COMPUTERWORLD. PLEASE INCLUDE A PHONE NUMBER FOR VERIFICATION.

More Up-to-the-Minute News!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I want more. I accept your offer of $42.95* for 51 weekly issues. That's a savings of over $5.00 off the basic subscription rate.



First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY (Circle one)**
   10 Manufacturer (other than computer)
   20 Finance/Insurance/Real Estate
   30 Medical/Law/Education
   40 Wholesale/Retail/Trade
   50 Business Service (except DP)
   60 Government - State/Federal/Local
   65 Communications Systems/Public Utilities/Transportation
   70 Mining/Construction/Petroleum/Refining/Agriculture
   80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   85 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   90 Computer/Peripheral Dealer/Dist./Retailer
   95 Other _____ (Please Specify)

2. **TITLE/FUNCTION (Circle one)**
   IS/MIS/DP MANAGEMENT
   19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   21 Dir./Mgr. MIS Services, Information Center
   22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm. Network Sys. Mgt., LAN Mgt., PC Mgt.
   23 Dir./Mgr. Sys. Development, Sys. Architecture
   31 Programming Management, Software Developers
   41 Engineering, Scientific, R&D Tech. Mgt.
   60 Sys. Integrators/VARs/ Consulting Mgt.

   CORPORATE MANAGEMENT
   11 President, Owner/Partner, General Mgt.
   12 Vice President, Asst. VP
   13 Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   51 Sales & Mktg. Management
   70 Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   80 Educator, Journalists, Librarians, Students
   90 Other Titled Personnel

3. Are you involved in the purchase or use of the following (Circle all that apply)
   a. Networking/Communication Equipment
   b. PCs/Workstations
   c. Large Scale/Midrange Systems
   d. Software
   e. Peripherals

E4337-3

More Desktop Computing!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I want more. I accept your offer of $42.95* for 51 weekly issues. That's a savings of over $5.00 off the basic subscription rate.



First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY (Circle one)**
   10 Manufacturer (other than computer)
   20 Finance/Insurance/Real Estate
   30 Medical/Law/Education
   40 Wholesale/Retail/Trade
   50 Business Service (except DP)
   60 Government - State/Federal/Local
   65 Communications Systems/Public Utilities/Transportation
   70 Mining/Construction/Petroleum/Refining/Agriculture
   80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   85 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   90 Computer/Peripheral Dealer/Dist./Retailer
   95 Other _____ (Please Specify)

2. **TITLE/FUNCTION (Circle one)**
   IS/MIS/DP MANAGEMENT
   19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   21 Dir./Mgr. MIS Services, Information Center
   22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm. Network Sys. Mgt., LAN Mgt., PC Mgt.
   23 Dir./Mgr. Sys. Development, Sys. Architecture
   31 Programming Management, Software Developers
   41 Engineering, Scientific, R&D Tech. Mgt.
   60 Sys. Integrators/VARs/ Consulting Mgt.

   CORPORATE MANAGEMENT
   11 President, Owner/Partner, General Mgt.
   12 Vice President, Asst. VP
   13 Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   51 Sales & Mktg. Management
   70 Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   80 Educator, Journalists, Librarians, Students
   90 Other Titled Personnel

3. Are you involved in the purchase or use of the following (Circle all that apply)
   a. Networking/Communication Equipment
   b. PCs/Workstations
   c. Large Scale/Midrange Systems
   d. Software
   e. Peripherals

E4337-3

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

COMPUTERWORLD

Editor in Chief
Bill Laberis
Editor
Paul Gillin
News Editor
Alan Alper
Technical Sections Editor
James Connolly
Assistant News Editor
Patricia Keefe
Technical Editor
Charles Babcock
Senior Editors
Elisabeth Horwitt
Networking
Heil Margolis
Management
Joanie M. Wexler
Networking
Johanna Ambrosio
Systems & Software
Ellis Booker
Advanced Technology
Michael Vizard
Personal Computing
Craig Stedman
Midrange Systems
Ed Scannell
Personal Computing
Senior Writers
Michael Fitzgerald
Melinda-Carol Ballou
Staff Writers
Lynda Radosevich
Stephen P. Klett Jr
New Products Writer
Lisa Davidson
Features Editor
Joanne Kelleher
Senior Editors
Joseph Maglitta, Corporate Strategies
Lory Zottola Dix, In Depth
Mary Brandel, CW Guide
Garry N. Ray, Firing Line
Allan E. Alter, Management
Associate Editor
Jodie Haze, Marketplace and Careers
Assistant Editor
Derek Slater
Assistant Researcher
Stefanie McCann, CW Guide
Intern
Erin Calloway
Research Manager
Michael L. Sullivan-Trainor
Research Coordinator
Kevin Burden
Chief Copy Editor
Anne McCrory
Assistant Chief Copy Editor
Christina Aicardi Maguire
Features Copy Editors
Kimberlee A. Smith
Steven J. Condon
Copy Editors
Jil Zaiot
Ellen Fanning
Michelle Keyo
Design Director
Nancy Kowal
Senior Graphic Designer
Tom Monahan
Design Assistant
Janell Genovese
Graphics Specialists
Stephane Faucher
Jose E. Bruzual
Cartoonist
Rich Tennant
Office Manager
Linda Gorgone
Editorial Assistants
Lorraine Witzell
Connie Brown
Aleksandra Skutle
Rights and Permissions Manager
Sharon Bryant
Computerworld Client/Server Journal
Maryfran Johnson, Editor
Managing Editor of Special Projects
Catherine McCreary
News Bureaus
Mid-Atlantic
Thomas Hoffman, Correspondent
(201) 967-1350
Washington, D.C.
Mitch Betts, National Correspondent
(202) 347-6718
Gary H. Anthes, Senior Correspondent
(202) 347-0134
West Coast
(415) 347-0555
Joan S. Bozman
Senior West Coast Editor
James Daly
Mark Halper
Senior Correspondents
Kim S. Nash
Correspondent
Chris Flanagan, Editorial Assistant
Midwest
Ellis Booker, Bureau Chief
(708) 827-4433
Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
(508) 879-0700
MCI Mail: 279-6273
CompuServe 76537,2613
Subscriptions: (800) 669-1002

How tiny do we really want computers to be?

Harvey Newquist

Smaller is not always better. Smaller airplane seats, smaller fast-food portions and smaller returns on investment are undesirable forms of shrinkage. And miniaturization of computers is rapidly moving into the same category.

The latest miniature computer, the subnotebook, is a mere mite with less size than a penpad, which in turn is smaller than a notebook computer, which is smaller than a laptop, which is smaller than.... you get the idea. Dedicated input devices for inventory or order taking should certainly be as compact as possible, but what about the reality of trying to do any sort of computing on these devices?



Paul Schulenburg

As an industry, we've become so enthralled by our ability to miniaturize computers and computer components that we've forgotten about the law of diminishing returns. We do have to interact with these devices and, at least for the moment, that means using our eyes and fingers, which have their own low-end size requirements for dealing with the world around them. That's why we have microscopes and tweezers.

So let's stop and take a firm grasp of reality for a moment. Most notebook and laptop computers aren't all that big, relatively speaking. A decent size laptop like Apple's PowerBook is not much bigger or heavier than your average Stephen King hardcover novel. Granted, lighter is always desirable in something you have to carry, but cutting into the actual size of the machine limits our capacity to deal with it efficiently. Right now, the keys of the PowerBook I am writing on are perfectly spaced for my fingers. If they were any smaller, I'd hit several at once or completely miss the one I'm aiming for.

Many miniaturization proponents say that such problems will disappear with pen computing, which will allow you to simply handwrite queries and information you want to store. Well, I gave up handwriting six years ago when I decided that keyboards were a faster way to communicate. Today, I don't handwrite anything, except for the occasional credit card receipt, and even that gives me cramps. I have no interest in going backward, especially when the space provided isn't big enough to accommodate a complete thought.

There is also the issue of being able to see our data displayed. Those LCD panels are often not much larger than an Elvis stamp. Such visual effrontery reminds me of an encounter I had with a colleague employed at a Japanese consumer electronics firm. This company was known for its miniaturization capabilities, and this colleague couldn't help but brag a little. "It's amazing how we've gotten miniaturization down to a fine art," he began. "We can now make televisions so small that you can't even see them!" OK, something may have been lost in the translation, but what he meant to say was still pretty absurd.

Until we can get to the stage where we're implanting chips in our skulls, we have to accommodate our own biological limitations.



None of us can view microscopic data. None of us can push our fingers through the eye of a needle. And all of us have more important things to do than ponder how many PCs can dance on the head of a pin.

Newquist writes and consults on advanced technology at the Relayer Group in Scottsdale, Ariz.

Keep regulators out of program code

OPEN MIND *by* Esther Dyson

Modern industrial society is becoming increasingly regulated. We are required by an ever greater number of authorities to file reports on everything from employment practices and safety measures to product ingredients and the location of rest rooms.



For now, the government and its agencies usually ask for paper — descriptions of reality and the output of the computer programs that manage various processes. Likewise, nowadays accountants audit "books," but they are starting to audit electronic data files.

In the long run, it's likely that regulators and certification authorities will delve even further and start to rule on the code that implements these functions. Auditors will check your accounting system. The government will check the software that manages the data you keep about employees. There will be certain "acceptable" search techniques that can be used to find suitable candidates for new positions and specific acceptable ways of testing your cookies for freshness and quality.

All of these functions are implemented and managed by software, so your code will have to conform as well.

As technology makes it possible to quantify compliance in more kinds of businesses, "authorities" of various kinds are likely to do so. Instead of testing the results, they can simply ask to see the code that implements your processes — hiring practices, safety protection, pollution management, lending decisions.

This could raise complex issues of responsibility. Will buying your applications from a reputable vendor constitute evidence of due care — just as sending a sample for testing to a certified lab is evidence of due care for a doctor — or will you need to take additional steps to verify the procedural compliance of commercial software?

Of course, the positive side to all this is that good practices will be codified and shared, and commercial software vendors will probably rush to provide certified functionality at a cheaper price than customers could achieve in-house.

But there's a downside, too. This trend is similar to the total quality movement. On its face a benign force, it can also be a way of ruling out those who don't follow a rigid — and in the end, limiting — set of rules and procedures. The moment you specify what is good, you run the risk of eliminating what could be better.

My concern is that too many processes will become petrified as a result of regulations that enforce and perpetuate temporary notions of goodness or political correctness. Re-engineering, after all, is supposed to be about continual change, not a onetime shift to something else permanent. What is a legacy but something too costly, in money or explanations to regulators, to change? We already have enough of those.

If it were left totally to the market, I'm sure enterprising developers would continue to come up with new and improved ways of doing things. But, once there's a way to describe and specify them too precisely, regulators may limit businesses' flexibility.



There's always tension between certifiably good enough and the very best. We should guard against anything that might impede our ability to break the rules creatively.

Dyson is editor of "Release 1.0," and "Rel-East," newsletters on new technology and new computer markets in Eastern Europe.

See Your Customers As Individuals, And You Could See A 15% Increase In Revenues.



No One Offers Better Ways To

You can never know too much about your customers. And with conventional mainframe systems you won't. Only AT&T/NCR can give you the processing power to extract individual customer profiles from the detail data that already exists in your enterprise. And the servers and networking power to move that information wherever it's needed.

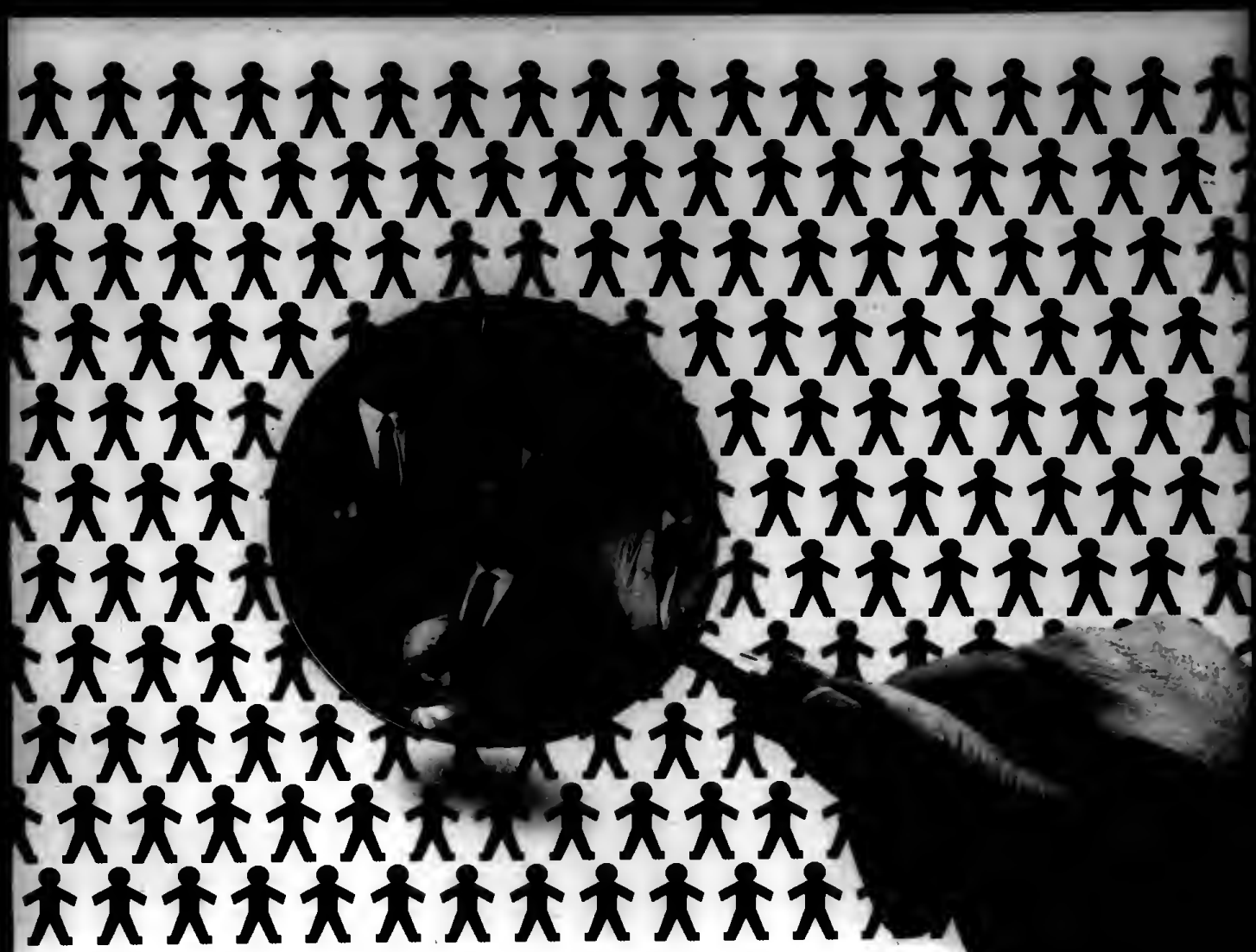
"The ability to manipulate large databases, analyze data, and get information out quickly to the people who need it gives us a number of advantages. We gain better insight on how to manage the Railroad, save money because we are better able to deploy assets, and ultimately improve customer service."

Joyce Wrenn,
Chief Information Officer,
Union Pacific Railroad

Better Knowledge Of Your Customers Can Mean A Better Bottom Line.

We can help you understand not only who your customers are and what they are doing, but what they're most likely to do *next*. So you can create specific marketing programs for each customer segment. Better sell and service existing customers. And develop new ones.

That can mean higher customer satisfaction and a better bottom line. In fact, our customers report revenue increases of as much as 15%.



Get Closer To Your Customers.

New Levels Of Power From A New Kind Of Information Company.

No other company in the world offers so many solutions for capturing data and turning it into actionable information. From mobile PCs, through the world's broadest, most powerful family of midrange servers, to massively-parallel processors.

intel inside

And no other company can match our global expertise in communications and networking. Once the information is generated, we can help you move it anywhere in the world, fast.

To get to know your customers better, phone **1 800 CALL-NCR** today. We can help you implement the breakthrough applications that will help you thrive in the future.

AT&T | NCR An AT&T Company

NCR is the name and mark of NCR Corporation. AT&T and the AT&T globe design are registered service marks and trademarks of American Telephone and Telegraph Company. Intel and the Intel Inside Logo are registered trademarks of Intel Corporation.
© 1993 NCR Corporation.



Hewlett-Packard's client/server solution helps Chesebrough-Pond's listen to customers more closely. This gives their marketing a fresh new complexion.

"Not only did HP work hard, but they were willing to team up with us. It became a true alliance, a true partnership."

— Gene Goodmaster,
Director of Management Information
Chesebrough-Pond's USA

Every year, 200,000 phone calls pour into the Consumer Information Center at Chesebrough-Pond's USA. And the number is growing 18% annually. By listening closely to each caller, they resolve customers' problems. And collect valuable marketing data.

To achieve a new level of service, they called us. Our answer was an HP client/server solution—an HP 9000 Business Server linked to thirty-two HP X stations, installed according to plan by HP's Professional Services Organization.

This Open Systems approach lets Chesebrough-Pond's reps respond immediately. It not only has the power to handle the increased volume fast and accurately. It also links into company-wide information systems to make the data instantly available.

To find out more, call 1-800-637-7740, Ext. 7701. It could make your company's future look even rosier than you think.



Think again.

HEWLETT PACKARD

©1993 Hewlett-Packard Company GSY9311

Data protection unveiled for DOS 6.0 users

By Ed Scannell

■ PC-Kwik Corp. has developed a utility that warns MS-DOS 6.0 users when they are reportedly at risk of losing data due to cross-linked files.

The basis of this latest problem, according to PC-Kwik President Bruce Shafer, is a little-understood function in the operating system's SmartDrive feature that is responsible for optimizing disk seeking.

"The SmartDrive feature has a way of putting the FAT structure [that could result in] cross-linked files," Shafer said. "The cause of it is subtle, but it is easy to make happen."

Like an elevator

The DOS 6.0 SmartDrive lays down data in the order of the hard drive's tracks to avoid disk seeking, making its operations faster. This method is sometimes called "elevator seeking," Shafer explained.

"It stores data much in the way an elevator would drop passengers off by floor instead of by the order in which they got on," Shafer said.

The elevator seeking technique was borrowed from mainframes, Shafer noted. It worked well in that environment because there was reliable power, trained users were assumed, and the operating system was protected from the applications, he said.

None of these circumstances can be assumed with desktop systems running DOS today, Shafer said.

The PC-Kwik utility, called Jeopardy Detector, is currently available on a number of bulletin boards including CompuServe, according to Shafer. Users can order the product directly from the vendor for a shipping and handling charge of $6.50.

Jeopardy Detector "essentially does a real-time CHKDSK watching for the FAT to get out of sync with the directory's structure. Whenever there's a problem, the screen border turns red to warn users they are walking on thin ice," Shafer explained.

No complaints

Microsoft officials said they have not received complaints from users resulting from this specific problem. In fact, they said SmartDrive does not even use the elevator seeking technique.

"We don't have elevator seeking in SmartDrive 4.0, which we had in Windows 3.1, nor did we in [SmartDrive] 4.1, which is in MS-DOS 6.0," said Ben Slivka, MS-DOS development manager.

"SmartDrive is in Windows 3.1 and we have sold 25 million copies of that, but we don't have people beating down our doors saying that write caching is killing them. It just isn't happening," Slivka said.

IBM powers up PS/2 line

New program aims to keep large customers happy, give firms PC edge

By Michael Fitzgerald
BOSTON, N.Y.

IBM PC Co. is ramping up its attempt to revitalize the Personal System/2 line, officials said recently. The effort focuses on Premium Partners, a scheme to keep major customers happy through unusual hand-holding, and renewed models of the venerable PS/2 line.

The Premium Partners program took a tentative first step in May and now has some 80 corporate users involved in at least a small way, according to Alan Langston, the PC Co.'s manager of premium brand desktop systems. PC Co. officials discussed some elements of the plan previously, but at the time they said the program was still evolving [CW, July 12].

Corporate America, particularly "customers who are rolling out large projects," is the target market for Premium Partners, Langston said. He added that the PC Co. expects to open the program to no more than 200 large customers and that it will phase in new accounts over time, as the company builds up its support staff.

The smallest Premium Partner program will typically include a rollout of at least 1,200 PCs over one year, the PC Co. said.

The ability to create a program like Premium Partners has resulted from the PC Co.'s organization around brand teams, said James Turner, the ontgoing general manager of the PC Co.'s Premium brand.

"I don't feel the whole weight of a $7 billion company on my shoulders — I'm focused just on our brand," he said.

Turner has needed to focus on his brand, which encompasses the PS/2, because it has lost a great deal of ground to upstart brands such as the PS/ValuePoint. In many eyes, the Premium brand is also the one part of the PC Co. that continues to exemplify the bad old days at IBM.

The new technology will come in the form of renewed Model 85 and 95 servers (now part of the Server brand at the PC Co.) and major en-

IBM, *page 42*



The PS/2 is no longer king of the hill at IBM PC Co. The PS/ ValuePoint sells as many units now, and the PS/1 is also growing faster. Jeffrey Henning, senior industry analyst at BIS Strategic Decisions in Norwell, Mass., said this illustrates how removed IBM is from the old Micro Channel Architecture-only days.

Premium Partners services

IBM PC Co.'s Premium Partners Program provides the following types of services for large projects. The smallest program typically includes a 1,200-PC rollout over one year.

▶ **Transition planning.** The PC Co. will brief the customers on upcoming products and work with them to test new features. The PC Co. also gets the rollout schedule for the project and assures the Premium Partner that the appropriate number of systems will be available at each step of the rollout.

▶ **Enhanced support.** The PC Co. assigns each project a "lab advocate" responsible for troubleshooting and answering questions. Besides the lab advocate, the PC Co. does not charge Premium Partners for access to a fee-based 800 number that is a step above HelpWare, the normal IBM support line.

▶ **Testing labs.** For a sliding fee, IBM will construct a test environment that duplicates the customer's so more accurate tests can be done to avoid problems during a rollout.

Database

Lotus fills gaps with Approach

By Kim S. Nash
CAMBRIDGE, MASS.

Lotus Development Corp. this week plans to ship Approach 2.1 for Windows, a PC end-user database Lotus inherited with a $20 million-plus buyout of Approach Software Corp. in June. The product is expected to fill a hole in SmartSuite, Lotus' office applications bundle.

Furthermore, Lotus plans to integrate Approach with its Notes groupware offering. Users have complained that although Notes is a capable product, it is limited by a lack of access to large relational databases, such as those from Oracle Corp. and Sybase, Inc. [CW, Aug. 16].

Approach provides direct one- and two-way connections to several databases via so-called PowerKeys, which are built-in drivers to relational systems. Available at no extra fee, PowerKey links are provided for dBase, FoxPro, Paradox, Oracle, Sybase and DB2. Open Database Connectivity support allows access to other systems, such as those from Informix, Inc. and The ASK Group, Inc.'s Ingres Products Division.

Approach notes

$99 buys you a copy of Lotus' Approach 2.1 for Windows database until the end of 1993. Then the price goes up to $195. Approach 2.0 users can get the new version from Lotus for a $20 mailing fee.

The product requires an Intel Corp. 80386-based PC, 2M bytes of memory, Windows 3.0, an IBM Video Graphics Array monitor and a pointing device such as a mouse.

For example, Akron, Ohio-based Goodyear Tire & Rubber Co. has installed Approach as a front-end reporting and data access tool for corporate data stored on Oracle databases.

Pluses and minuses

In broad strokes, Approach — like Microsoft Corp.'s Access and Borland International, Inc.'s FoxPro — is aimed at PC users. However, Approach does not contain programming tools as extensive as Access or FoxPro, said Kevin Harvey, general manager for Lotus' Approach.

"It's more a database front end with simple programming capabilities," Harvey said.

In that regard, Approach is comparable to Symantec Corp.'s recently announced Q&A Write for Windows 4.0 or AskSam Systems' AskSam for Windows.

Users can build mailing lists and labels and basic reports with the product, based on data housed in other databases, spreadsheets or word processing applications. For example, BP Oil Co. expects to see a decrease in the time its information systems department spends facilitating user reports and data queries as a result

Lotus, *page 41*

Why PowerBook is popular with people who are in the middle of nowhere.



Office support. *PowerBook runs all the applications you need to run your business, no matter where it may be. Including inventory spreadsheets, databases and presentation software.*

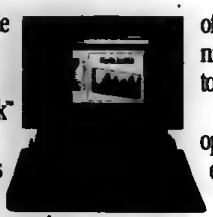
Industry support. *According to a recent article in* InfoWorld, *"It's difficult to imagine what Apple could have done better in designing the PowerBook Duo and Duo Dock. From the inject/eject mechanism to trackball location, the engineering is a masterpiece.'"*

Road support. *Simply because you're out on the road doesn't mean you should be out of touch. If needed, help is just a phone call away. Our toll-free repair line is always there to assist at a moment's notice.*

Financial support. *PowerBook is so easy to use, it gets used more often to do more things. Saving you thousands of dollars in training and support costs.*

Back support. *There are PowerBook models that weigh as little as 4.2 lb. So they fit comfortably in any briefcase and can be easily carried from appointment to appointment.*

Business has a habit of taking people to some rather out-of-the-way places. Which is probably why more and more people are now taking Apple® PowerBook™ computers along for the trip.



No other notebook computer makes it so easy for businesspeople to stay productive when they're working out on the road.

PowerBook comes equipped with a complete set of built-in ports and easy-to-use communication software, so users stay connected to their office no matter where they go.

With AppleTalk® Remote Access and an optional fax/modem, PowerBook users can easily dial into their network back home to access information from their desktop computers. Such as up-to-the-minute sales and inventory figures. Servers and e-mail messages. Or even send and receive faxes at the touch of a button.

And PowerBook remains the only notebook computer uniquely designed for people whose jobs tend to take them away from their desks. Making it easier for them to get any kind of work done, anywhere it has to get done.

These days, business is taking people places they never dreamed of. And with a PowerBook at their side, there's no telling how far they'll go.

InfoWorld, June 14, 1993. © 1993 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, AppleTalk, Macintosh and "The power to be your best" are registered trademarks of Apple Computer, Inc. PowerBook, PowerBook DUO

Why PowerBook is popular with people who are in the middle of everything.

More flexible. *There are now two PowerBook Duo models that can instantly turn into powerful, fully expandable desktop systems when used with a Duo Dock. So you always have all your current files with you wherever you go.*



More colorful. *Presentations on the road take on new brilliance with a color PowerBook. Video-out capabilities allow you to hook up easily to a 16-inch monitor as well as most projection devices. Or present directly from the PowerBook active-matrix display.*

More informative. *You can use your PowerBook to integrate large amounts of information for sales forecasts, analyses and reporting. Everything you need to turn ordinary presentations into extraordinary ones.*

More compatible. *The optional PowerBook/DOS Companion™ kit provides software and connectors that make it easy to work with the MS-DOS and Windows files, printers and displays you already own.*

More popular. *Anyone can pick up an Apple PowerBook computer and start working right away — without having to learn arcane commands and cryptic codes other notebooks ask of you.*

PowerBook is also enormously popular among people whose responsibilities vary as much as their travel schedules.

One minute they're working at their desk on a sales forecast. The next, flying across the country to address a roomful of customers. And PowerBook is the only notebook computer specifically designed to keep up with the pace.

Away from your desk, Apple QuickTime™ software makes it incredibly easy for PowerBook users to put on stunning presentations to virtually any size audience. Complete with video, animation and sound.

And with a wide range of full-featured models to choose from, you can give different types of users the right tools for the jobs they have to do.

There are PowerBook computers that come with monochrome, gray-scale and color displays. With floppy disk drives and video-out capabilities. There are even PowerBook Duo™ models that can instantly be turned into fully expandable desktop computers when used with the Duo Dock. A bit of Apple engineering genius that *InfoWorld* magazine recently called "a masterpiece."

Because people never know where business may take them these days, PowerBook provides the power needed to get there.

The power to be your best.™

Apple

Compliments. PowerBook Duo and QuickTime are trademarks of Apple Computer Inc. MS-DOS is a registered trademark of Microsoft Corporation. This ad was created using Macintosh and PowerBook personal computers.



The Key To Integrating Your Network And Business Objectives Is An Open View.

Managing your network is managing your business. The key to success is clear vision with an open point of view. Because achieving your objectives requires making all kinds of things work well together.

The Racal Management System does just that. It is now integrated with HP's OpenView® platform (and we still interface with IBM® NetView™), so more companies than ever can move up to integrated network management.



Easily tailored, the Racal Management System is capable of managing the widest array of devices in the industry (including Racal's 350 products). Fact is, it's one of the best overall solutions for integrated management challenges. And when it comes to integrating legacy systems and devices into a common management environment, our Multivendor Integration ToolKit makes a difficult task simple and more affordable.

No wonder *Communications Week's* comprehensive 1993 SNMP Managers test series ranked the Racal Management System "a topnotch management platform" and praised "the degree to which the management of WAN equipment and facilities has been integrated with the system."

Look into network management with an open view. Call **1-800-RACAL-55** for a free information package about integrating your business and network objectives. It's a real eye-opener.

RACAL

© 1993 Racal-Datacom, Inc. All rights reserved. HP OpenView is a registered trademark of Hewlett-Packard Co.
All other registered and unregistered trademarks are the property of their respective owners.

Paul Gillin

The hype battle



You can't blame OS/2 users for engaging in a little "I told you so" right now.

The new Version 2.1 of OS/2 is a major improvement over its predecessor, incorporating much-improved Windows support, simpler installation and a nicer interface.

And that's not all. At the Personal Software Products Group's Technical Interchange in Orlando, Fla., late last month, IBMers also outlined to more than 2,100 attendees a lot of tasty future plans for OS/2. These include a smaller version that fits in 4M bytes of memory, a common object model that will greatly reduce the difficulty of porting OS/2 applications to other IBM operating systems and a general direction statement to embrace just about every open standard that means anything.

OS/2 is also benefiting from some early bad press about Microsoft's Windows NT, which has been berated for gorging on memory and disk space while not having a whole lot more to show for it than OS/2 has out of the box. The fact that NT is not the mother of all operating systems is seen by some as a vindication of OS/2.

OS/2 definition

But don't celebrate too much. True, IBM deserves a lot of credit for sticking with OS/2 during two years of incredible NT hype, but the Blue crew still has a lot of work to do to define just what OS/2 really is. Is it a desktop operating system? If so, then it needs application support, which is tough to get without mass-market interest, and the mass market isn't flocking to an OS/2 that doesn't have applications.

Is it a server platform for enterprise networking? If so, then OS/2 gets thrown into the soup with Unix, NetWare and NT, and frankly, its networking capabilities don't fare too well against them.

Is OS/2 something in between? If so, then that's a precarious position to be in. Witness the historically poor market performance of operating systems that try to expand out of their core platform.

Meanwhile, Microsoft has done a good job of delivering on its promises with NT. I've spent a little time hammering on it in a completely nonscientific setting and haven't been able to break it. As an operating system for someone with plenty of hardware to burn, it's tough to beat.

However, where OS/2 appears very strong is among corporate and vertical market developers who really need multitasking for background communications, transaction procession or multiple sessions in very specific applications. There is a large and committed community of those users. But IBM hasn't figured out how to translate that support into broad-based market appeal.

For one thing, it's too busy engaging in a war of fear, uncertainty and doubt (FUD) with Microsoft. Microsoft has been whispering for some time that when IBM loses the rights to Windows source code this month, it won't be able to maintain Windows compatibility.

However, IBM isn't above firing a FUD volley of its own. OS/2 backers point out that Microsoft can't seem to make up its mind about whether the future of Windows lies in NT or the 32-bit Chicago product due next year. Lois Dimpfel, IBM PSP director of Personal Operating Systems, notes that IBM has perpetual rights to use the Windows application programming interface, ensuring that OS/2 will remain compatible with all future 32-bit extensions to Windows and Windows NT.

The only curveball Microsoft could throw would be to introduce a new 16-bit programming call for Windows, which is something Dimpfel said she can't imagine Microsoft doing. And Windows NT itself doesn't exactly bat a thousand on Windows support.

Microsoft has also not done as bad a job defining the future of Windows as IBM would have you believe. While it was guilty of hyping NT's role initially, Microsoft has worked hard during the last year both to temper expectations about how many people would want to install a big, Unix-like operating system on their desktop and to point Windows 3.X users toward Chicago.

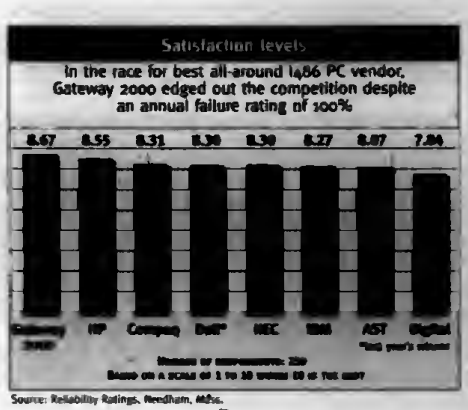
I have a soft spot for IBM in this area. OS/2 is the most efficient, flexible and reliable PC operating system on the market, and it's shipping today. IBM has stuck with it through a difficult two years, and it looks like that support will continue. But I just don't see this product breaking out of its niche, at least not while Microsoft has a finger on the FUD button and can keep OS/2 cornered between an uncertain position and Microsoft's promises of things yet to come.

Gillin is *Computerworld*'s editor. His MCI Mail address is 575-4120.

Survey rates 486 PCs

The same chip gains different results in different systems

By Stephen P. Kiett Jr.



Source: Reliability Ratings, Needham, Mass.

Are all 486-based PCs created equal? Not by a long shot, according to a recently released study of eight leading Intel Corp. 1486 PC vendors by Reliability Ratings in Needham, Mass.

"486-based systems are not a commodity," said Greg Strakosch, president of the market research firm. "Just because they all use Intel chips does not mean they are the same. People buying on these expectations — on price alone — may be disappointed with what they get. ... Our results show a 50-fold difference between the least and most reliable."

The study rated 21 systems, including some from IBM's ValuePoint and Personal System/2 lines, Compaq Computer Corp.'s ProLines and DeskPro, Digital Equipment Corp.'s DECpc family, Dell Computer Corp.'s Dimension 486DX/33 and Gateway 2000, inc.'s 4DX-33. Data was collected from more than 250 end-user sites representing 28,000 486 PCs and more than 43 million hours of runtime.

Each vendor was rated on overall reliability, service, technical support, functionality, upgradability, price competitiveness, monitor and performance.

Average failure rate

According to the study, the average annual rate of failure ranged from 25% to 30%. Those failures included problems such as malfunctions with CPU boards, disk drives and keyboards. NEC Corp. had the best reliability score at 1.6%, followed by IBM with scores ranging from 3% to 6.22%. Gateway 2000 fared the worst with a 100% annual failure rate.

However, Gateway 2000 outgunned everyone for the highest overall customer satisfaction rating (see chart). More than 90% of the Gateway users surveyed said they would buy Gateway systems again.

While the Gateway 2000 responses appear to be in conflict with each other, Strakosch said they are due to the fact that people buy the Gateway 2000 systems "to get a great deal" on price. Therefore, Gateway users are much more tolerant of failures than are IBM, Hewlett-Packard Co. and Dell customers.

For example, while Strakosch said IBM had the most consistent marks across the board, it also had the second-lowest customer satisfaction rating.

"High customer expectations are like an anchor around IBM's neck," Strakosch said. "IBM's customers are intolerant of minor glitches, while the exact same customers grant clone-makers much greater leeway because of the perception of getting a better deal."

Bug reports

Users of Dell and Gateway 2000 PCs reported the greatest numbers of system bugs, Strakosch said. Gateway 2000's troubles revolved around the 4DX-33's system board, and Dell's were mainly with keyboards, monitors and mice.

One Gateway 2000 site with 100 4DX-33 systems installed reported 10 system board failures, Strakosch said. Gateway replaced the 10 failed boards as well as the remaining 90 systems, which lowered its reliability score dramatically.

In the report, Gateway 2000 said the problem was "an exceptional case" and that it "is confident that the [mean time between failure] levels reported here are worse than those of the installed universe of the model, or of other products in the company's line."

A Dell spokesperson confirmed that the company experienced problems with some of its peripheral products but attributed them to difficulties with its suppliers that have since been remedied.

"The 1993 study on 486 Reliability & Customer Satisfaction" is available for $295, according to Reliability Ratings.

Lotus fills in gaps

CONTINUED FROM PAGE 37

of using Approach, according to John Chamberlain, a PC manager at the company.

SQL hooks key

Meanwhile, Lotus is expected to roll out the first strains of Approach integration with Notes groupware within two to three months, Harvey confirmed. Approach's access to SQL databases will be key for Notes.

Separately, Lotus is working on drivers to link Notes to SQL engines but has yet to deliver those products [CW, Sept. 6].

SQL facilities as part of Notes would, for example, allow the system to better balance requests to corporate databases.

For instance, if 500 Notes users want to query a central SQL database, processing such a large number of ad hoc queries would likely be quite slow.

Approach could capture data from a SQL database at the start of a session and bring it down to the desktop level for users to manipulate locally.

That would diminish network traffic allowing data to be returned to the server after end users were finished with it.

Apple makes moves to squash Newton's bugs

By James Daly
CUPERTINO, CALIF

Summer is the traditional time for bugs, and users found them everywhere. At the barbecue. At the beach. And in the Apple Computer, inc. Newton personal digital assistant.

As the company rushes to complete the nationwide rollont of the Newton MessagePad this week, technicians are scrambling to simultaneously release an updated system software package designed to stamp out problems with the unit's power supply and handwriting translation capabilities.

"Like any new product, it needs s little fine-tuning," said James Joaquin, product line manager of Newton software and tools.

Handwriting, power problems

Participants on electronic forums like CompuServe have chastised Apple for the MessagePad's handwriting recognition and power difficulties. The MessagePad has even come under attack in the "Doonesbury" comic strip.

Users said the main problem is that handwritten words do not get translated into type. Some translated words may even get wiped ont and replaced with a dot. Joaquin said the workaround was to reset the machine.

Power complaints include reports of units that will not automatically sleep and of others that shnt down inexqilicably while in use. Users who have received an alert when they turned on the Message Pad have found that pressing the reset button, which does not cause data loss, solves the problem temporarily.

Some battery problems reportedly also occur when the Newton runs with alkaline batteries instead of the nickel-cadmium rechargeable pack.

Joaquin said that while such difficulties are "rare" — complaints have been received from less than 5% of the customers, he said — the updated system software should correct them. It is expected to be available shortly on both Personal Computer Memory Card international Association cards and from on-line services.

User lessons

Apple has blamed some of the problems on the inexperience of users. Analysts said such difficulties frequently occur with any new technology.

"It's like riding a bicycle; once you learn how to do it, it's easy," said Frank Rogan, an engineering software consultant in Beaverton, Ore.

Apple also plans to offer free training classes that will guide MessagePad customers in properly setting the recognition controls, which are crucial to proper handwriting translation, according to Joaquin.

Joaquin insisted that the key to Newton is adapting to it as much as it adapts to you. For users who clear "the burdle of training," the Newton MessagePad should prove its worth, he said.

But some users have complained that the Newton trains you rather than vice versa.

Sharp Electronics, which made Newton's hardware, will reportedly ship its own ExpertPad Newton derivative with the upgraded software installed, sources close to the company said.

IBM powers PS/2

CONTINUED FROM PAGE 37

hancements to tbe PS/2 desktop line.

Turner, who will retire from IBM at the end of this month, worked with the late Don Estridge on the original IBM PC. "It's been a pendulum swing all the way back to [the Estridge] days in terms of our level of responsibility and enthusiasm. The only difference between now and then is the complexity of the industry," Turner said.

But the focus on large customers may be burting tbe PC Co.'s sales elsewhere.

"We bought into the new company for the three-year warranty and pulled in 18 machines last December, but I'm real frustrated now witb IBM," said Richard Cbandler, director of computer operations at Radio City Music Hall Productions in New York. Chandler, who runs a small 160-PC sbop, said be had trouble getting support from the PC Co. and has run into four-month waits and extra expense to get parts such as a Creative Labs, inc. SoundBlaster card that runs on the Micro Channel Architecture.

His problems have caused him to not even consider the ValuePoint, turning instead to Compaq Computer Corp. and Dell Computer Corp. for new PCs.

Analysts said Premium Partners might remove the tarnisb from the PS/2 name, but it is too early to tell. insiders said that if the program fails, the PS/2 may not be something IBM can afford to carry.

"It could be a good opportunity — that kind of service is worth thousands of dollars, and if you're buying 2,000 systems, this can be worth a lot more money," said Richard Zwetchkenbaum, research manager at international Data Corp. in Framingham, Mass.

Zwetchkenbaum added that "if they didn't have the PS/2 line they probably wouldn't be profitable and would be losing customers. A lot of customers are committed to [tbe PS/2], and these are their highest-profile customers. Also, IBM initially said it would differentiate the premium brand witb service and support, and everybody bas caught np with them in terms of offering a three-year warranty."

WHISTLING UNDERWATER.

WALTZING TO RAP MUSIC.

Help desks made easier

By Stephen P. Klett Jr.
SAN FRANCISCO

A traditional help desk hot line often cannot immediately resolve the calls it receives. Calls that require further research or the assistance of experts are in danger of "falling through the cracks." Answer Computer, Inc. recently unveiled its next-generation antomated help desk system with promises to seal these cracks by putting the expertise needed to solve users' problems at each service representative's fingertips.

An extension to Apriori 4.0, Apriori GT is a graphical user interface-based, process-driven support system that integrates work-flow management with problem/query management and resolution. It provides the help desk with a central, indexed source of data about users, known problems and proven solutions.

Beta-test nsers said Apriori's main benefit was that it eliminated the need for support staffers to be system experts, resulting in improved response times.

For example, Apriori GT enabled JC Penney Co. in Dallas to condense 10 support teams into three covering hroader areas: point-of-sale, general office and floor-room systems. "Support staff now rely on Apriori's point-and-click capabilities to direct them to solntions rather than their own memory and manuals," said Dean Wortham, manager of the retailer's store systems hot line.

Wortham estimated that more than 80% of callers' questions are answered with the first call and that less than 5% of calls pertain to problems that have not been heard before and, therefore, are not documented in the system.

Features new to Apriori GT include the following:

- On-line access to the help desk database and documentation for all departments in a company.
- The ability to set conditional events to measure the quality of end-user support. For example, the system can be set to notify the appropriate manager if a user calls a representative with the same question three times in one week.
- A fax-back capability that gives users faxed copies of Apriori information.
- A utility called TexTracer that provides immediate access to printed, archived and on-line information.

Beta site

JC Penney has been using Apriori to support users at its more than 1,400 stores since 1990. It has been beta-testing Apriori GT for almost four months.

Wortham said TexTracer is one of Apriori GT's most intriguing features. "TexTracer will enable us to do searches based on strings of characters across multiple systems," he said. For example, support personnel will use TexTracer to access the same help desk screen that mainframe users see, enabling the support people to tell the users over the phone where to find help.

Apriori GT also contains Group Workflow Management, an application that allows the information systems department to tailor support to specific groups.

Analysts said this feature sets Apriori apart from other off-the-shelf automated help desk software packages.

Apriori GT is slated to ship late this month at prices starting at approximately $50,000 for a 10-user system.

The 'new' IBM

Skeptics said IBM PC Co. could never bounce back in the PC market because of the number of longtime IBMers employed there. Analysts said these long-entrenched Blue-brains have in fact helped lead the PC Co.'s turnaround [CW, Sept. 6].

"Even though they have 30-year IBMers in there, these people [have been] freed to do what they want to do," said Leslie Fiering, an analyst at Gartner Group, Inc. Fiering said the PC Co. benefits from its ability to tap into ongoing IBM research and development and its existing infrastructure.

"The PC Co. meets every IBMer's wildest fantasies: It leverages IBM's traditional strengths while getting away from many of the traditional burdens," Fiering added.

IBM business partners also gave the PC Co. high marks. "They are far more aggressive now," said Mark Eppley, chairman of Traveling Software, Inc. in Bothell, Wash.

Still, aggressiveness has its price.

The different brand teams "don't seem to talk to each other," said Jennifer Munson, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H. She said this made the PC Co.'s product strategies lack coherence. Other observers agreed.

"At times the number of brands can be a bit confusing," said Steven Eskenazi, an analyst at Alex. Brown & Sons, Inc. "I'd like to see them have a bit more of a cohesive strategy."

But Robert Corrigan, the PC Co.'s president, cited the broad branding and distribution strategy implemented this year as something that has helped it regain market presence.

"I can take some risks now, like Ambra, without putting the whole business in jeopardy," he said.

Ambra, an IBM subsidiary that sells products without the IBM name, presents a radically different way of doing business for the PC Co.

—Michael Fitzgerald

TYPING WITH BOXING GLOVES.

MOVING MISSION-CRITICAL APPLICATIONS TO CLIENT/SERVER.

Jeffrey Henning

Notebooks catering to power users



When you are choosing between subnotebook PCs and notebook PCs, begin by characterizing the potential users. Can you categorize them as power users or as ... as what? Powerless users?

The lack of an industry term for the opposite of power users indicates a blind spot — a failure to place user needs above technology. Not everyone loves technology for its own sake. For the nontechies — you might call them convenience users — the computer is simply another piece of office equipment, albeit one they spend a lot of time with.

While power users are fascinated by the computer as both an end in itself and a means to an end, convenience users are interested only in the end results; they are more interested in accomplishing a task than understanding technology.

Instead of classifying our users by their preference for power or convenience, we superficially separate users by new tech vs. old tech: Will so-and-so demand new technology or put up with old technology? This failure to classify users is especially problematic when assessing notebooks vs. subnotebooks.

Poor fit

Convenience users are poorly served by today's portable PCs, which were designed to offer almost as much functionality as desktops. Convenience users want portability over functionality. Eventually, technology will give them both, but until then they will look for portability first. The trick for IS managers is to determine what level of functionality these users need.

The lack of an industry term for the opposite of power users indicates a blind spot — a failure to place user needs above technology. Not everyone loves technology for its own sake.

For convenience users, the average notebook PC — at 6.2 pounds — is too heavy. Whenever users travel with a typical notebook they must consciously balance the advantages of having the computer with them against the disadvantages of lugging the computer around. Convenience users look to the day when PCs are "subconsciously portable" — that is, when a portable can be carried around without the user's having to make a conscious decision to carry it.

While portables are a long way from this, vendors hope subnotebooks are a step in the right direction. Unfortunately, most subnotebooks are subpar. To fit the components of a notebook PC into a package that weighs less than 4 pounds, quite a bit is left out — RAM, hard-disk capacity, a fax modem and a floppy disk drive.

The universal omission of the internal floppy disk drive alienates many prospective users because 40% of mobile professionals need to exchange information using floppies while traveling. The need to lug around an external drive makes a subnotebook heavier and less convenient.

Trade-offs

Most subnotebooks make too many trade-offs for convenience users. The notable exception is Hewlett-Packard's 2.9-pound OmniBook, which HP specifically designed for nonpower users. The OmniBook offers Microsoft Word and Excel in read-only memory to provide instant access to applications and to minimize the disadvantages of low hard-disk capacity.

While this is perfect for the convenience user, it is insulting to the power user, who will want to install applications of his own choice. The OmniBook uses only a 20-MHz 386 CPU. Power users will want a 486, but convenience users will appreciate the long battery life (five to eight hours) enabled by the 386.

Convenience users would take an internal floppy disk drive, trading off the burden of an extra pound in weight, but there are no products in the 4- to 5-pound range from any major vendor. This "heavy subnotebook" category or "light notebook" does not fit PC vendors' technology-driven view of the world, but such a product would better meet the needs of the oft-ignored convenience user.

Although it does not live up to the OmniBook, the current generation of subnotebooks is most suitable for people who need accessible computer power but who don't need to replicate the power of a modern desktop PC (these users may be making do with 286- or 386-based desktops).

Subnotebooks are best for word processing and spreadsheet addicts who miss the convenience of these applications when traveling.

Traditional notebooks, on the other hand, are intended to provide power users with functionality comparable to that of desktops. Notebook users will want word processors and spreadsheets as well as communications software, large databases and presentation packages.

In the quest for appropriate products, it is up to IS managers to make sure that convenience users aren't powerless.

PC vendors are biased. Not biased in favor of a race or gender but in favor of one type of customer — the power user. The power user is the favorite target customer for PC vendors because the power user is willing to pay handsomely for the benefits of advanced technology.

Henning is a senior industry analyst at BIS Strategic Decisions in Norwell, Mass.

Integrated circuitry

Texas Instruments demonstrates quick chip technology

By Ellis Booker

Claiming a significant advance in integrated circuit fabrication, Texas Instruments, Inc. said it produced a chip in just three days, a process that normally takes two to three weeks.

For the technical demonstration, TI used so-called single-wafer processing, in which all manufacturing steps take place on a single silicon wafer. The conventional fabrication of integrated circuits involves large numbers of wafers, processed in batch.

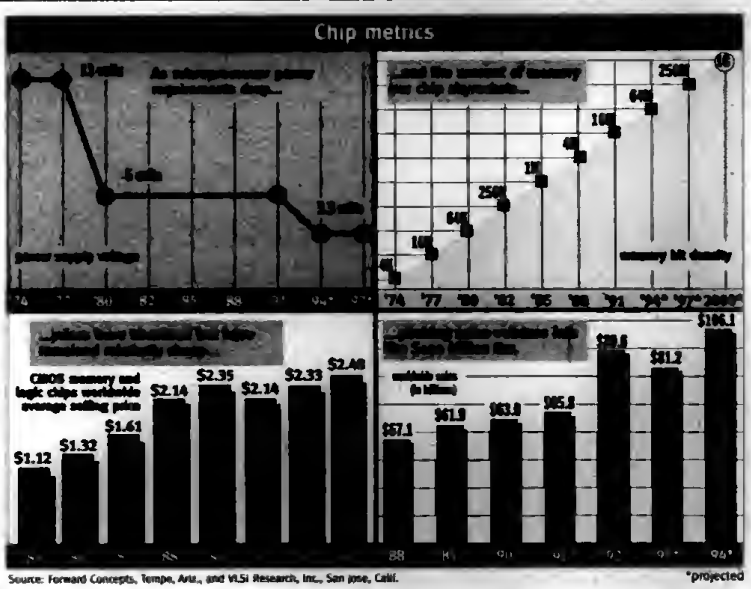
This "fab in box" approach has been talked about for years, said Will Strauss, president of Forward Concepts, a semiconductor market research firm in Tempe, Ariz.

Concept never materialized

"It's a concept that's been around for a long time; even the Russians have said they had it . . . but up until now no one has demonstrated it," said Strauss, who estimated that TI is a good two years away from any kind of working prototype of the concept.

For integrated circuit producers, however, the economics of such single-step fabrication are compelling and could translate into lower system prices for end users.

Currently, world-class semiconductor makers such as TI spend $500 million per chip-processing facility and its associated hardware.



Source: Forward Concepts, Tempe, Ariz., and VLSI Research, Inc., San Jose, Calif.

Long-term savings

A single-step technology might cost only a few million dollars because the plethora of fabrication equipment (numerous tools, each dedicated to a single function) could be consolidated into one or more devices.

For the manufacturing technology demonstration, the complementary metal-oxide semiconductor logic and memory chips were fabricated at the company's semiconductor research laboratory in Dallas.

TI said it might use the rapid manufacturing method for TI custom chips or chip prototypes, which could be tested prior to volume production.

The chips were produced as part of TI's Microelectronics Manufacturing Science and Technology program, a U.S. Department of Defense initiative to develop next-generation semiconductors.

TI won the program contract in 1988. It was awarded by the U.S. Air Force and the Defense Advanced Research Projects Agency.



Migrating mission-critical applications to client/server is no longer a far-fetched concept. Only PROGRESS gives you the flexibility to develop and deploy the toughest applications that work in client/server or host-terminal configurations, as GUI or character-based applications. They can also interoperate and run across hundreds of different systems without recoding. So call **1-800-4PROGRESS** for more information (or **1-800-989-3773** for details on upcoming seminars). It could change the way you think about client/server.

PROGRESS SOFTWARE

The Application Developer's Choice for Client/Server.

©1993 PROGRESS® is a registered trademark of PROGRESS SOFTWARE CORPORATION

Software Publishing Corp. has announced SuperBase 2.0 for Windows, its programmable relational PC database product.

According to the Santa Clara, Calif.-based company, SuperBase 2.0 features a wide-ranging image import, a manipulation and display capability, a relational advanced visual environment that provides an intelligent macro recorder, an automatic code-generation capability as well as Basic language support.

The single-user price for SuperBase 2.0 is $495.

▶ *Software Publishing*
(408) 986-8000

On Technology Corp. has announced that Meeting Maker XP, its group scheduler for the Macintosh, is now available for the Windows market.

The interoperable group scheduling product lets users of both platforms plan, schedule and confirm meetings using desktop computers, according to the Cambridge, Mass.-based company.

The software offers a Propose Meeting feature that schedules a time and date, chooses the required guests, prepares agendas and reserves conference rooms. The first available time for all required attendees is automatically located with the Auto-Pick feature.

Meeting Maker XP prices range from $57 to $79 per user.

▶ *On Technology*
(617) 374-1400

Telcor Systems Corp. has announced T/PortTwin, a dual-port version of its T/Port serial port adapter series.

According to the Natick, Mass.-based company, the T/PortTwin enables users to simultaneously send and receive data or fax communications in background mode, while they keep working in the foreground.

Users do not have to wait for file transfers to be completed before starting to work again in the foreground. A dedicated coprocessor and 16K-byte transmit and receive buffers are on each port of the product.

T/PortTwin costs $139.

▶ *Telcor Systems*
(508) 653-3995

Data General Corp. in Westboro, Mass., has introduced DG/Vilision, a series of PCs, and the addition of several mid-range models to the Dasher II line of performance PCs.

Two models of DG/Vilision are available. The DGVilision 425R is based on the 25-MHz 1486SX microprocessor from Intel Corp., and the DG/Vilision 433R is based on the 33-MHz 1486SX.

Both systems are certified to function as Novell, Inc. NetWare clients and feature 4M bytes of random-access memory (upgradable to 32M bytes); an overdrive socket for Pentium upgrades; integrated local bus graphics; one 3½-in. floppy disk drive; one 130M- or 213M-byte integrated drive electronics (IDE) hard drive; two available 5¼-in. IDE drive bays; and three full-size, 16-bit XT/AT bus expansion slots.

A keyboard and mouse are also included, and MS-DOS 6.0, Windows 3. t and systems utilities are preinstalled.

Prices range from $1,450 to $2,595.

▶ *Data General*
(508) 366-8911

DeskStation Technology, Inc. in Lenexa, Kansas, has announced its Evolution Series reduced instruction set computing PCs for Microsoft Corp.'s Windows NT.

Powered by a Mips Technologies, Inc. R4400, the RPC 44LE (Limited Edition) is housed in a minitower chassis and offers the following: 16M bytes of random-access memory (expandable to 64M bytes); 512K bytes of secondary cache; a Small Computer Systems Interface-II subsystem with a 240M-byte hard disk drive; a S3-based video card; a 3½-in. floppy disk drive; a Sony CD-ROM drive; and a keyboard, mouse and preinstalled Windows NT.

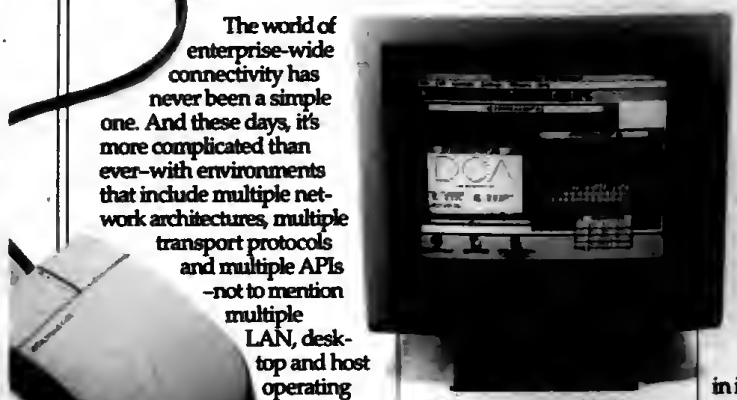
The Evolution Series RPC 44LE can be used for Windows NT server applications such as scientific analysis, computer-aided design and engineering, desktop publishing and imaging, according to the company.

The product costs $4,495.

▶ *DeskStation Technology*
(913) 599-1900

RMA WORKSTATION.
THE PATH TO POWER.
THE TOOLS TO USE IT.

The world of enterprise-wide connectivity has never been a simple one. And these days, it's more complicated than ever–with environments that include multiple network architectures, multiple transport protocols and multiple APIs –not to mention multiple LAN, desktop and host operating systems. What the world needs is a single, uniform set of workstation-to-host communications solutions.



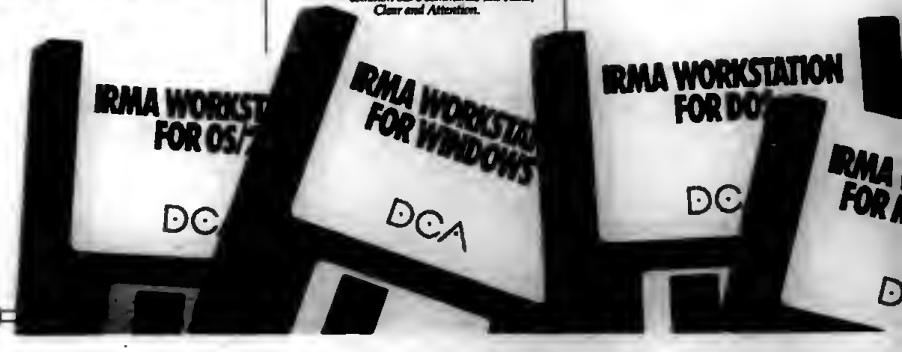
Multiple sessions, QuickPad and QuickBar productivity enhancers, and API graphics support are just a few of the strengths of IRMA WorkStation for Windows.

IRMA WorkStation for Windows is the only Windows 3270 software with a QuickBar for instant access to functions like File Transfer, as well as other common 3270 commands like Reset, Clear and Attention.

That single set of solutions is IRMA™ WorkStation, from DCA®. The only complete family of micro-to-host connectivity software for DOS, Windows,™ Macintosh,® and OS/2.® And when Windows NT™ ships, IRMA WorkStation for Windows NT will be ready, too.

yes It runs with NetWare

Each is a powerful solution in its own right, each now available in a new, greatly enhanced version. Together, they represent a path to the powerful world created by the synergy



Product shorts

2010 Software Corp. has introdnced Sherlock 2.0 for IBM PCs running Windows 3.1. The software provides a system fnr managing files with 254-character file descriptions instead of eight-character file names, according to the company. Cost: $139 fnr single users and $695 for a 10-station local-area network pack. 2010 Software, New York, N.Y. (212) 887-9555.

Systems Compatibility Corp. has announced Version 2.1 nf Outside In for Windows, a file viewing and data import utility. This npgrade includes viewers for 15 new file formats, optional file conversions as well as support for Object Linking and Embedding in word processing files, the company reported. Cost: $89. Systems Compatibility, Chicago, Ill. (312) 329-0700.... **FLX Corp.** has announced FLX Visual HR, an integrated human resources and benefits management system for Windows. Unlimited history for all employee data is maintained on the system. The product provides more than 110 standard reports for benefits, compensation, government compliance and more, the company reported. Cost: Starts at less than $895. FLX, West Chester, Pa. (215) 696-6600.

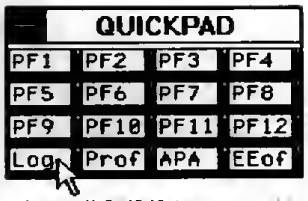
International Computers has introduced VideoOut, an IBM PC/AT/XT/386/486 compatible plug-in card and software that lets users display their computer screens on a TV or save them to videotape. Cost: $99. International Computers, Wauwatosa, Wis. (414) 764-9000.... **Epson America, Inc.** has announced ActionNote 4SLC/33, a notebook that offers improved power management, 30% faster processing and a brighter LCD screen than its predecessor, according to the company. Cost: Starts at $1,699. Epson America, Torrance, Calif. (310) 782-5161.

Lightning Computers has introduced the Thunderbox Ultimate Pentium, a 60-MHz, 64-bit Pentium system that provides the following: a 520M-byte FAST Small Compnter Systems Interface-2 Quantum hard disk drive, 16M bytes nf random-access memory, Hercules Graphite local bus graphics accelerator, Toshiba dual-speed CD-ROM and a Mediavision Pro Audio Spectrum sound card. In addition, a 17-in., flat-screen, noninterlaced Super Video Graphics Array monitor is included, according to the company. Cost: $6,995. Lightning Computers, San Francisco, Calif. (415) 543-3111.

Ares Software has introdnced FontMinder 2.0, a font-management utility for Windows 3.1. Features include a refined interface, archiving, font previewing prior to installation, comprehensive type sample generation, portable font packs and an intelligent Adobe Systems, Inc. PostScript font downloader, according to the company. Cost: $79.95. Ares, Foster City, Calif. (415) 578-9090.

Intex Solutions, Inc. has announced that 16 nf its spreadsheet enhancements are compatible with Lotus Development Corp.'s Lotus 1-2-3 Release 4.0. These enhancements include the following: a capacity analyst, clip artist, CFO spreadsheet applications, forms-to-go, spreadsheet scheduler, operations manager, Intex bond calculations, Intex mortgage-backed calculations, inventory analyst professional, among others. Cost: Starts at $99. Intex, Needham, Mass. (617) 449-6222.

Expert Software has introduced the Expert Travel Planner Gold Edition for Windows, a customizable travel program. Features include the ability to plan a trip to any destination using a network of freeways, tollways, primary and secondary roads within the U.S., Alaska, Canada and Mexico; print a detailed itinerary; choose from three route classes (quickest, shortest and most scenic); and customize maps using any combination of fonts and colors, according to the company. Cost: $49.95. Expert Software, Coral Gables, Fla. (305) 567-9990



A customizable QuickPad floats on your screen, giving you instant access to macros, scripts and frequently used keys with a click of a mouse.

of the desktop and the networked host/server.

The IRMA WorkStation family now supports Novell® NetWare for SAA® and TN3270 over TCP/IP, as well as a variety of other connections. Moreover, IRMA WorkStation products can bring to a mixed-platform environment a uniformity that results in the simplification of support, training, installation and configuration.

Each IRMA WorkStation product gives you a graphical keyboard editor to allow you to easily customize your keyboard. They share powerful file transfer capabilities. They all allow you to run third-party applications that utilize HLLAPI, and offer cross-platform Application Development Tool Kits like DCA's new QuickApp.™



Full support for System 7 features, including Balloon Help and Publish.

QuickApp lets you write a single workstation application that can be used on all your platforms. And it's the first example of DCA's Universal Communications Architecture (UCA), a framework that provides consistent access, features and APIs across host environments, network transports and desktop operating systems.

The graphical programs share features like QuickHit,™ the ability to send commands by simply clicking on a PF key indicator in the host session display, and customizable QuickPads, to automate common tasks.



In short, IRMA WorkStation offers your organization the freedom to communicate without being bound by the constraints of a single platform.

From now through December 31, 1993, you can trade up to your choice of our new products from an earlier version–or from any competitive product–for only $95. (That's $330 off the suggested retail price. And the price can be even less, when you buy Multi-Paks of 10, 50 or 100.) You can also call for free demo disks.

But call soon. It's the first step on the path to new power for your whole organization.

Call 1-800-348-3221, ext. 38E,* for your $95 trade-up or for free demo disks.



The most connectivity options across the most platforms, including NetWare for SAA and TN3270 over TCP/IP.

	DOS	WIN	MAC	OS/2
CUT	●	●	●	●
DFT	●	●	●	●
SDLC	●	●		●
802.2	●	●	●	●
X.25				●
TN3270 over TCP/IP	●		●	●
Async		●		
IBM 5250		●		
[illegible] with DCA's RLN	●	●		
Novell NetWare for SAA	●	●	●	●
DCA IRMALAN/EP	●	●	●	
DCA Select Comm Server	●	●	●	●
DEC DECnet SNA Gateway*	●	●		
[illegible] for 3270*	●	●		
SNA Server for Windows NT	●	●		●
[illegible] SNA LAN*		●		
DCA FT/[illegible]	●	●	●	●
[illegible] LINK FT/TSO and FT/CMS	●	●	●	
IBM IND$FILE	●	●	●	●
3270 APA Graphics	●	●	●	
APPC	●	●		●
HLLAPI	●	●	●	●
Application Development Tool Kits	●	●	●	●
Graphical Keyboard Editor	●	●	●	●
QuickScript/Scripting/Macros		●	●	
QuickBar Toolbar		●		
QuickPad and QuickHit		●	●	●

● Coming Fall '93. ● Third party availability

THE FREEDOM TO COMMUNICATE.

DCA

To call (800) 475-8388. Upgrade good in U.S. and Canada only to 12/31/93. Allow 6-8 weeks for delivery. © 1993 Digital Communications Associates, Inc. All rights reserved. DCA and IRMALINK are registered trademarks and IRMA, IRMALAN, QuickPad, QuickHit, QuickScript, QuickApp, FT/Express, RLN and Select are trademarks of Digital Communications Associates, Inc. Windows and Windows NT are trademarks of Microsoft Corporation. All other trademarks are the property of their owners. Developer-tested only. Novell makes no warranty with respect to this product. The DECnet™ SNA Gateway and PATHWORKS™ software are available from Digital Equipment Corporation. Call 1-800-DIGITAL. *Available from Banyan. Call 1-800-828-2404.

WINDOWS

RECRUITING TALENT FOR BOSTON?

Advertise in the September 20th Eastern Edition when *Computerworld's* regional Careers feature examines "IS Careers in Boston." Ad Close: September 16th.

800 343-6474 ext. 201

You have a reservoir of information.

How much is reaching your customer and how fast?

If your customers only knew you offer a product they want or a service they need. If your customers only knew what you know. Because what your customers don't know leaves revenue-generating potential untapped.

That's why Unisys has developed a powerful initiative—CUSTOMERIZE—to help business turn customer service into a competitive advantage. Unisys can help CUSTOMERIZE your enterprise by extending information technology out to field locations, where a customer

cus-tom-er-ize \ kŭs'-tə-mə-rīze' \ *vt* **1:** to make a company more responsive to its customers and better able to attract new ones **2:** to customerize an organization's information strategy, e.g., to extend systems capabilities to field locations and other points of customer contact and support **3:** what Unisys Corporation does for a growing roster of companies, and government agencies, worldwide *syn* see CUSTOMER SERVICE, COMPETITIVE EDGE, BUSINESS-CRITICAL SOLUTIONS, REVENUE GENERATION

decides to do business with you—or not. And where a critical influence over that decision is timely information. With a comprehensive, timely flow of information, you'll



optimize customer satisfaction, sales content, and competitiveness.

UNISYS

We make it happen.

Call us at 1-800-874-8647, ext 13. Ask for a complimentary CUSTOMERIZE Information Kit, and a CUSTOMERIZE™ assessment to help evaluate your organization's information flow. We'll help you convert information into a stream of customers—and revenue.

©1993 Unisys Corporation.

CUSTOMERIZE is a service mark of Unisys Corporation.

"OK IBM, here's your chance to prove yourself."

❒ Send me more information on your Business Recovery Services.

❒ Tell me more about your seminars.

❒ Have an IBM Business Recovery Specialist call me.



Name _____

Company _____ Title _____

Address _____

City _____ State _____ Zip Code _____

Phone Number _____

CW

NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO 40 ROCHESTER MN

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Department 351
Building 658D
3605 Highway 52 N
Rochester, MN 55901-9908

Peer-to-peer technology faces uphill climb

IS executives remain unconvinced that peer networks fit their needs over server-based schemes

By Ed Scannell

■ While IBM's LAN Systems for Personal Software Products plans to ship a beta-test version of its peer-to-peer technology for OS/2 in the next month or so, the company remains unsure of just how broad-based the market opportunity is.

In LAN Systems' research during the last few months more than a few corporate information systems managers have told IBM executives they still prefer a server-based approach to computing over peer-to-peer.

"Peer-to-peer must act like a server. If it doesn't, IS doesn't much care. For them it must look like an adjunct to a client/server system," said Art Olbert, director of LAN Systems for Personal Software Products.

"If you can't introduce a product IS is comfortable with, chances are you are not going to get in the door," Olbert said.

Several corporate managers interviewed recently backed up most of Olbert's assertions, indicating that many peer-to-peer technologies are useful but remain either limited or not practical for many mission-critical applications.

"If all you are doing is eliminating 'Sneakernet' problems, then peer-to-peer will get you by. But if you want to protect the investment in your files, you are probably better off with a server-based environment," said John Chapman, a senior technology consultant at Amaco, Inc.'s technology introduction division in Chicago.

Overrated market

Despite all the attention that products such as Microsoft Corp.'s Windows for Workgroups have received from the media and analysts during the last year, Olbert said he thinks the peer-to-peer market is smaller than most believe.

"The peer market, from what we can see, is not all that large," Olbert said.

Analysts at market research firm International Data Corp. in Framingham, Mass., estimated the peer-to-peer networking market at 1.1 million nodes (see chart).

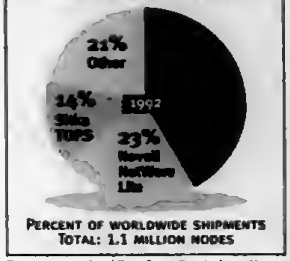
The other opportunity for IBM in the peer-to-peer market, other than medium-size to large corporate accounts, is smaller businesses. But there, too, Olbert said he sees a couple of significant obstacles.

The first is in reaching these users in large volumes through available distribution channels. Many value-added resellers that would sell peer-to-peer networks to smaller customers either do not have the incentive or the expertise.

"There is a market for this if you look at what companies like Arti-Soft have done," Olbert said. "But I am really not certain we can get to [the small business] market with the kind of volumes we would like to see."

Cautious steps

Entering a market of limited size, IBM is hedging its bets on the success of peer-to-peer OS/2 technology



PERCENT OF WORLDWIDE SHIPMENTS
TOTAL: 1.1 MILLION NODES

Source: International Data Corp., Framingham, Mass.

Administration woes

Another problem in selling to small businesses is that once a peer-to-peer network grows to more than five to 10 users, someone must be dedicated to taking care of its administrative aspects. This is something small companies typically cannot afford or have little expertise in.

"Once you grow beyond five users it becomes tough for them to administer. It can sometimes become counterproductive," Olbert said. "When you distribute that capability to the desktop, you can chew up a knowledge worker's time."

Currently, IBM offers peer-to-peer capabilities for file and print in its LAN Server 3.0 offering but not for database functions.

If it turns out that LAN Systems does not go forward in developing a separate peer-to-peer product, it might salvage the work done so far by wrapping it in with LAN Server, Olbert said.

Workstations

Want Unix videoconferencing? Build it yourself

By Jean S. Bozman

People who want to use their Unix workstations as videoconferencing machines had better be do-it-yourselfers: Most systems require an optional compression card, software and a sizable slice of network bandwidth.

But early users said the technology is worth the trouble. It offers low-cost links between co-workers across a university campus, scientists across an ocean or business partners across the world.

Strain on bandwidth

Compared with dedicated videoconferencing systems, such as those from PictureTel Corp. in Peabody, Mass., workstation solutions are much less expensive (see chart).

But many sites are just beginning to tap the technology, expressing concern that widespread conferences might strain the limited bandwidth on their local-area network campuses.

"Videoconferences on LANs are still for the early adopters," said Scott Winkler, a software analyst at Gartner Group, Inc.'s Software Management Strategies Service in Stamford, Conn. "It's for those who are willing to experiment, who are not afraid of making incorrect vendor decisions, but who see the benefits and are willing to take risks."

Among those risks are potential disruptions to the LAN, said Randy Robinson, manager of network information services at the NASA Ames Research Center near Mountain View, Calif.

"Network resources are not infinite," he said. "If you've got a dozen or so people trying to conference across the campus, everyone else would be competing for time on the network."

NASA Ames has more than 1,500 Unix workstations on campus, he said. A recent pilot test at less than 10 frames per second on a 10M bit/sec. LAN was abandoned after an unexplained network disruption, Robinson said.

Positive results

Other users have had better results. Randy Butler is team leader for networking development at the National Center for Supercomputing Applications at the University of Illinois' Urbana-Champaign campus. He uses Sun Microsystems,

Unix, *page 58*

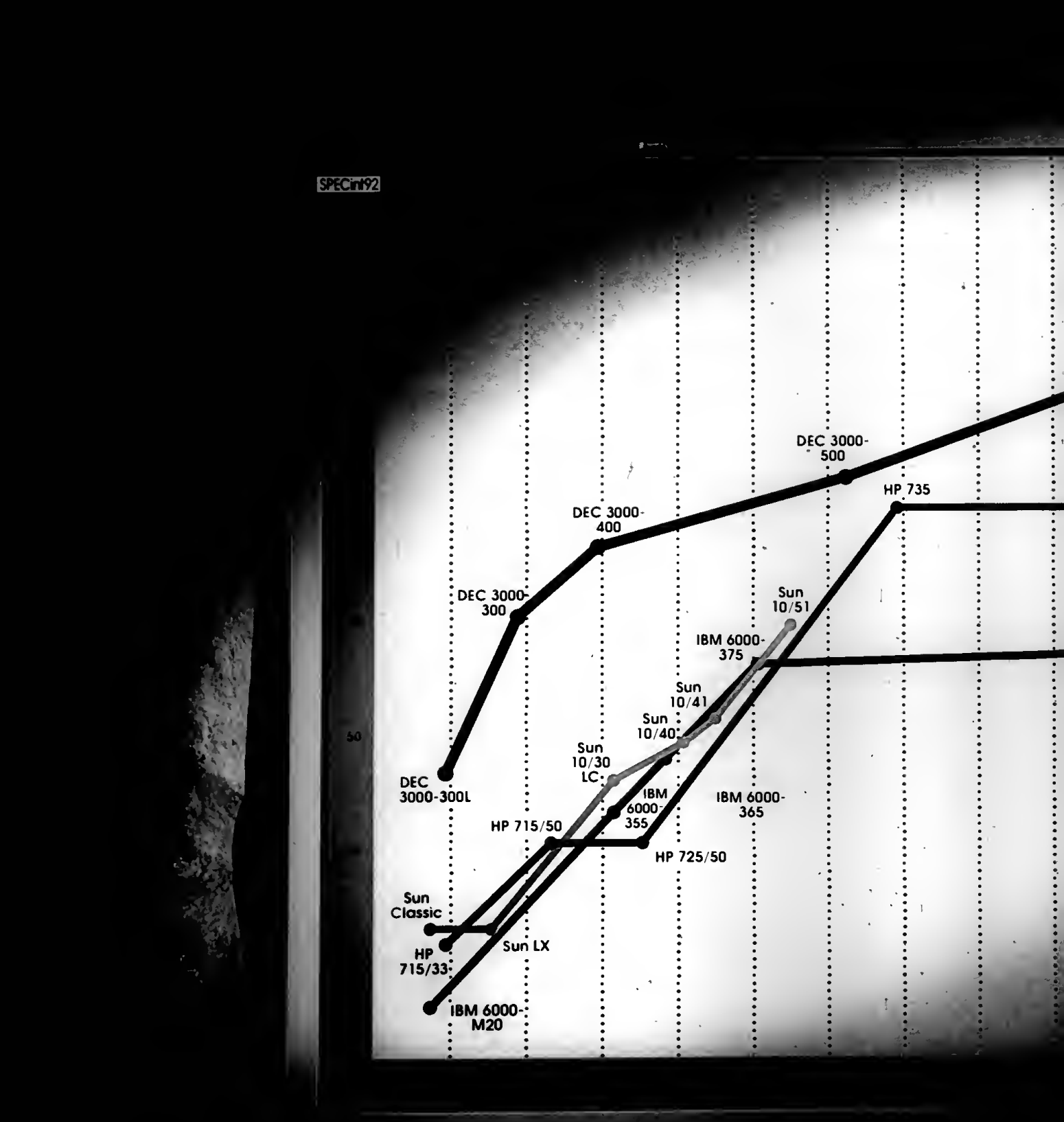
Build your own

Leading workstation vendors are putting together workstations for videoconferencing

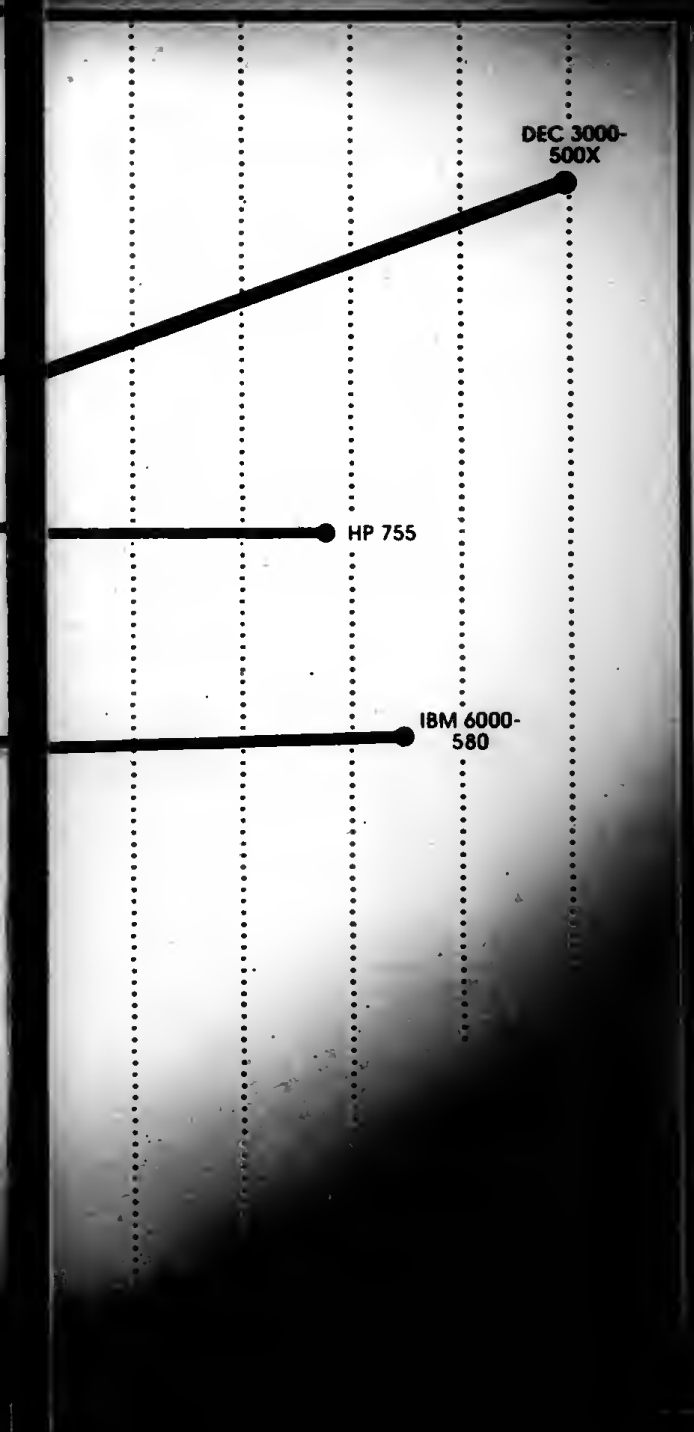
Vendor	System	Option cards	Software	Network support
Apple	DEC 3000 Alpha AXP $9,900	Sound & Motion J300 $2,750	DECspin $995	ISDN T1 T3 Ethernet FDDI
	DECstation 5000 $5,000-$12,000	TX Framebuffer $1,000 DEC Video/PIP $3,995		
	Series 700 workstations Model 715/33 $5,695 Model 725/50 $17,050 Model 735 $34,795	HP Video Line Card $2,275	Insoft, Inc. Communique $1,395	Ethernet FDDI ISDN
	Indy $4,995	Card included	In Person $495	Ethernet ISDN FDDI
	Indigo[2] $28,000	Indigo[2] Video $3,995		
Sun Microsystems	SPARCclassic $3,995	Sun Video Pix $795	Insoft Communique Rasterops $1,295 Parallax $1,695 XIL (X Imaging Library) fall announcement	ISDN Ethernet FDDI
	SPARCstation 10 $15,000-$45,000	Rasterops Corp. TV 2 card $1,599 Parallax Graphics, Inc. XVideo $4,995		

Down-the-road improvements

The Internet is developing a protocol, known as IP Multicast, that will efficiently route workstation videoconference calls across Unix networks by 1995. Typical Internet multicasts now send videoconference "packets" to users at rates of 200K to 300K bit/sec. However, full-motion video — with compression — would require 60M bit/sec. between any two workstations.



imagine working faster than you ever imagined.



...HP" AND
...THEIR PLACE.

...three new members
...cation family—the
...family of workstations.
...workstation; the
...DEC 3000. The Model 300,
...for under $9,000. And
...500X—the world's fastest, period.
...workstations. They're built through
...technology, so powerful they can
...increase your productivity and provide
...you never before thought possible.
And all are available now.
...more about Alpha AXP workstations,
...comprehensive trade-in and migration
...of pre-sales technical assistance,
call 1-800-DIGITAL, Dept. ... and ask for
...7M. Or, for immediate information
...Digital's Alpha AXP Fast FAX, call
...U.S. and Canada. Or
...Digital Representative.



digital



Around the world over nine million businesses share a common practice. They back up and store important data on quarter-inch data cartridges. And the brand they choose most is 3M. For good reason.

3M data cartridges are built for reliability—from the tape formulation to the cartridge itself. Whatever capacity you need—formatted or unformatted—3M cartridges are ready to save the day with proven performance. That's why more businesses protect important information on 3M brand data storage products than any other brand in the world. For more information and your free "Data Security Handbook" call 1-800-888-1889, ext. 43.

The common denominator

of business around the world.



Reliability

TV tuning made profitable

By Mitch Betts
ATHENS, GA

When Hollywood's television moguls decide on their prime-time schedule for the new season, they rely a little on research and a lot on gut feelings. But in the face of declining profits and fierce competition, intuition may not be good enough.

> "Where a show is placed is infinitely more important than the content of the show."
> — Michael Dann, veteran TV programmer

Hoping to add a dose of scientific rigor to the art of TV programming, three faculty members from the University of Georgia have developed a computer program that takes hundreds of variables into account to produce the most profitable TV schedule.

The computer model, dubbed SPOT, or Scheduling of Programs Optimally for Television, was produced by business professors Srinivas K. Reddy, Jay E. Aronson and Antonie Stam and is about to emerge from the prototype stage.

In a test of the prototype that used actual data from 1990, a cable TV network (which requested anonymity) found it would have seen a 1.4% increase in annual profits, or $4.5 million.



Low-cost shows such as "Cops" from Fox can be more profitable than some highly rated shows

Aronson said that increase could be significant for networks with razor-thin profit margins. The system gives the network manager new insights into programming and counter-programming strategies, he said.

Aronson said the decision-support software works best on an IBM RISC System/6000 workstation but can be used on high-end PCs and mainframes as well.

The program's inputs include predicted ratings, competing and lead-in shows, historic patterns, advertising revenue potential and the cost of producing each show. The optimization model then juggles the schedule until it arrives at the network manager's main objective, which may be to maximize ratings, revenue or profits.

Traditionally, TV networks have tried to maximize ratings, but that may be changing as profits become a more pressing goal. Even a highly rated show can be unprofitable if it costs too much to produce, and a low-cost show with mediocre ratings can be profitable.

"The revenues of the major networks have not kept pace with rising program costs," Aronson said. The cost of producing an hour of prime-time network programming has jumped from $200,000 in 1971 to more than $1 million today.

Brokerage firm moves toward client/server

Front-end minicomputers replaced by POWERservers

By Thomas Hoffman
MARYLAND HEIGHTS, MO.

■ Edward D. Jones & Co., a $550 million, privately held brokerage based here, plans to add another 400 offices to its national total of 2,300 sites by the end of this year. Accommodating that growth called for a calculated plan to convert elements of its centralized information systems structure to a client/server computing format.

That plan culminated in the recent launch of a project to replace six IBM Series/1 front-end minicomputers with two IBM RISC System/6000 POWERserver Model 580 servers, according to Rich Malone, an Edward D. Jones partner responsible for data and voice communications at the firm. The servers will enable the company's branch offices to run certain applications locally, such as the development of local customer and prospect lists.



Edward D. Jones' Rich Malone: *Mainframes will be used to handle brokerage trades and back-office processing — even after client/server platform is installed*

For now, Edward D. Jones will continue to rely on its Burroughs Corp. (now part of Unisys Corp.) terminals until it decides on a client hardware platform. Malone said the brokerage is leaning toward either Unix or X Window System terminals from IBM or Sun Microsystems Computer Corp.

Proposed amendments

By early next month, when the RS/6000 machines become fully operational, the brokerage said it expects to have amended its Hughes Network Systems, Inc. satellite network. It will run the Ethernet local-area network protocol and the Transmission Control Protocol/Internet Protocol (TCP/IP) between branch terminals and IBM 3090 Model 500J and Amdahl Corp. 700A mainframes at its headquarters using Hughes' LANAdvantage network products.

Malone said that by replacing a proprietary Burroughs network protocol with Ethernet and TCP/IP capabilities, Edward D. Jones expects to increase network response time for branch users.

The move should also pave the way for future bandwidth requirements as the brokerage moves ahead with fax, image and video technologies across the network. At present, the Burroughs serial attachments can accommodate 9.6K bit/sec. In contrast, the Ethernet LAN will be able to handle 10M bit/sec., Malone said. The 4,000-plus Burroughs terminals will remain until the brokerage decides on a replacement workstation platform by year's end.

Mainframe to server

By using the servers to run some of the branch applications locally, Edward D. Jones hopes to move some of its centralized applications, such as the maintenance of regional customer files, from its mainframes to its servers. Still, brokerage trades and back-office processing will continue to be handled by the mainframes after the client/server architecture is completed, Malone said.

"By off-loading some processing off our mainframes, we expect that we'll only have to upgrade our mainframes once every two years or more instead of once a year as we had been," Malone said.

For now, the company is running the IBM RS/6000 servers on proprietary software developed in-house that would accommodate the Burroughs networking protocol. By mid-October, Edward D. Jones expects to have decided between IBM's OS/2 and Unix as the operating system to run the RS/6000 servers using the TCP/IP protocol.

Ventana Windows software debuts

By Michael Vizard
TUCSON, ARIZ

Ventana Corp. plans in January to launch a Windows version of its electronic meeting software, which provides a mechanism for organizations to survey participants anonymously.

Previewed at the recent Groupware '93 show in San Jose, Calif., GroupSystems consists of a series of modules that are intended to help people organize and evaluate ideas in a group setting. Windows will provide a point-and-click interface to the existing product that should serve to increase activities in meetings.

"GroupSystems really enhances productivity because you can have multiple conversations going at the same time. People are just itching to get their hands on a mouse with the new version," said Carol Flament, joint application development facilitator at Southern New England Telephone Co. in North Haven, Conn.

At the core of the offering is an Agenda module where actual discussions are stored. Tools included in this module are an Electronic Brainstorming facility, a List Maker, a Group Outliner, a Topic Commenter and Voting.

Other components include a People module that lists who is in the meeting, a Board module that provides a white board for sharing comments, a Handout module that allows users to share documents such as spreadsheets and word processors in their native format and an Opinion module that rates the general mood of a group on a particular topic.

Southern New England Telephone has adopted the DOS version of GroupSystems to help facilitate business re-engineering discussions, post product reviews and advance customer focus groups.

According to Flament, GroupSystems gets people more involved in discussions because no one individual is identified during a meeting. The setup prevents one personality, such as the company chairman, from dominating the meeting, while also drawing comments from people who might not otherwise contribute ideas.

Flament said her organization currently uses GroupSystems as an aid to meetings convened in specific rooms, but she said she expects to deploy GroupSystems in a distributed fashion as users become more familiar with it.

"Right now, you still need a facilitator to walk people through the meeting," Flament said.

Pricing for GroupSystems starts at $24,900 for a 20-user license, which includes training and one year of maintenance. The package requires 4M bytes of random-access memory and can be used across any NetBIOS-compatible network.

Staying in touch

IBM licensed GroupSystems from Ventana in the late 1980s and marketed the product under the name TeamFocus. Southern New England Telephone adopted GroupSystems in place of TeamFocus. "We felt that Ventana was more in touch with the real world," said Carol Flament, joint application development facilitator.

Franco Vitaliano

Get the message?

With all the buzz about client/server, sooner or later your shop will try to develop an application based on remote procedure calls (RPC). It may even work.

In that case, you may find yourself trapped in a cargo-cult mentality — i.e., the great magical plane landed once, therefore we build a religion around this semi-mystical event and continue to hope for similar miracles.

The potential problem with any religion (technical or otherwise) is that it can blind you from exploring alternatives. In the case of client/server applications, the unexplored alternative to RPC is network message-passing systems.

When you use an RPC, essentially you lock two or more pieces of a distributed application together in a long-distance embrace. If the server is tied up with other calling clients, then you must wait. Only when the server is ready to deal with your client will your remote application be released. Thus, RPC client/server applications are inherently synchronous.

Distributed Computing Environment (DCE) RPC threads do not get around this because most implementations of Unix cannot handle more than one RPC thread at a time, so there are no re-entrant libraries.

Imagine for a moment what such a lockont could do to an RPC application's throughput on a busy network. Your RPC application's exquisitely cultivated performance could quickly go to seed.

Message-passing applications are much more capable of dealing with remotes. A message is typically passed from the client to a server, stacked in a queue, examined by one or more server applications and acted on when the server is able to. In other words, message-passing systems are asynchronous.

Connection essential

Some may argue an RPC's guaranteed connection between client and server is essential for some mission-critical applications, such as on-line transaction processing (OLTP). However, we are already beginning to see some OLTP systems emerging that use message-passing. For example, Pittsburgh-based Transare's Encina OLTP system will soon be integrated with a message-passing product from Systems Strategies in New York.

Even IBM is developing message-passing products, such as its Message Queue Interface (MQI) for MVS as well as for some of its other platforms. In its Network Blueprint, IBM has elevated MQI to the same status as the DCE RPC and its own Common Programming Interface for Communications. Digital, IBM's perennial Avis, is also offering DECMessageQ. Digital's VMS-originated messaging product has already been used in some real-time distributed applications.

Both companies will likely expand their systems to their Unix and PC platforms as complete implementations in the future. Also at the high end of the messaging market is Covia Technologies in Rosemont, Ill., with its Integrator.

But perhaps the most exciting message-passing action is taking place at the LAN level, with several small companies slugging it out for mind/market share. Peer Logic in San Francisco has Pipes, which offers a system that is operating system-independent and network transport-independent. Via Pipes, a distributed PC application can flexibly communicate over a NetWare LAN to a Unix TCP/IP box. Essentially, Pipes packages a gateway inside each piece of the distributed application. Pipes MVS support is also promised soon. Message Express from Horizon Strategies in Needham, Mass., is vying for the same LAN market.

Unix shops that want to try a great no-cost network message-passing system can pick up a free copy of the Parallel Virtual Machine, PVM 3.X, off the Internet at Oak Ridge National Labs (ornl.gov).

So, the question is not whether message-passing is viable, but rather isn't it time you broke out of your RPC-cult mentality?

Vitaliano is a Boston-based writer specializing in distributed computing.

Free Seminar on CD-ROM and Multimedia Publishing

Call 1-800-229-2222 to attend a remarkable half-day seminar that gives you a closer look at real world applications, benefits, costs and shows you how to evaluate and get started in this exciting technology.

Now you can get an inside look at the latest in CD-ROM and multimedia publishing.

The seminar is sponsored by Dataware Technologies, the world leader in CD-ROM software and services, and Emerging Technology Applications, the CD-ROM publishing unit of IDG, the world leader in providing information on information technology.

Sponsors also include Sony Electronics Inc., demonstrating their portable Multimedia CD-ROM Player and CD Recordable technology; Hitachi, showing their new multi-session CD-ROM drive; and Adobe Systems, Inc., introducing Adobe Acrobat to CD-ROM publishers.

Look at real world applications
You'll see exactly how leading companies are using these technologies today. And gain a better understanding of how your company can profit from them.

You'll learn how to get started; the title development process; how to choose software and hardware, and benefit from the experience of other companies who are already using CD-ROM and multimedia as a competitive advantage.

Look at new technologies
You'll discover new ways to work with CD-ROM. Like cross-platform publishing which allows you to distribute one disc that runs on DOS, Windows, Macintosh and UNIX; CD-Recordable which enables you to create a CD-ROM disc at your desk; portable multimedia players, and more.

Look at interactive demonstrations
You'll see a detailed demo of the EnterpriseComputing Database and view popular CD-ROM applications on multiple platforms, as well as through Adobe Acrobat.

Look at all you get
You'll take home a free copy of the EnterpriseComputing Database demonstration disc.

And *The Guide to CD-ROM and Multimedia Publishing*, a 39-page industry report which shows you how CD-ROM can benefit your company, how to estimate costs, application development, hardware selection and much more.

Look at your schedule
The seminars are absolutely free. Simply call Dataware Technologies at 1-800-229-2222 and ask for the seminar registration desk. Or, check the seminar you wish to attend on the form below and fax it to 1-617-621-0307.

***FREE!* The Enterprise Computing Database**



Now get a chance to sample the power of CD-ROM with unlimited access to six months of information.

The EnterpriseComputing Database is a comprehensive source of news, product reviews, industry summaries and more, with fully indexed text of over 35,000 articles from Computerworld, Network World and InfoWorld plus over 2500 research summaries from leading IDG research companies.

Six months of information is yours free when you attend any of the CD-ROM and Multimedia seminars.

Seminar Reservation Form

	Location	Date
☐	Detroit/Troy	September 22
☐	Columbus	September 23
☐	Milwaukee	September 28
☐	Newark, NJ	September 28
☐	New York	September 29
☐	Chicago	September 29
☐	Philadelphia	September 30
☐	Dallas	September 30
☐	Washington, D.C.	October 5
☐	Stamford, CT	October 5
☐	Boston	October 6
☐	Atlanta	October 6
☐	Raleigh/Durham, NC	October 7
☐	Denver	October 7
☐	San Jose	October 19
☐	Long Beach, CA	October 20

☐ Yes, I'd like a closer look. Please reserve a place for me at the seminar I have checked.

☐ No, I cannot attend the seminar, but I am interested. Please have a representative call me.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

CW

FAX this Seminar Reservation Form to 1-617-621-0307

IDG World Expo

COMPUTERWORLD

ETA Emerging Technology Applications An IDG Company

Adobe

SONY.

DATAWARE TECHNOLOGIES

All brands and product names, trademark or registered trademarks are the properties of their respective companies.

"To get the best Disaster Recovery Plan, I went with the little guy."



"Yes, IBM."



IBM is the underdog, so we'll do whatever it takes to get your business.

Of course, IBM is a worldwide leader. And in many areas of the computer business, we are the biggest. But we'll be the first to admit, there's one area where we aren't the leader. Yet.

In Disaster Recovery, we're still the little guy, so to speak. We weren't the first to get into the DR business, nor are we the biggest player.

And let's face it, when you are the underdog you have to do more, including whatever it takes to win you over. If that means jumping through a few hoops for you, so be it.

Consider a few facts about our Business Recovery Services.



Hot sites, remote sites and sites unseen.

To begin with, we have more sites than anyone. So if disaster does strike, you don't have to worry about waiting in line to get your business going again, because there won't be a line. We have 13 strategically-located hot sites nationwide as well as another 12 remote sites. And unlike any of our competitors, we even back up our backup. If need be, we can tap into IBM facilities all over the country. As a result, we can assign a site to you the moment you call us, and you'll be up and running again in no time.

No matter what type of computer equipment you have, high-end or midrange systems, advanced workstations or personal

computers, we can customize a hot site to meet the needs of your backup plan. And we encourage you to test your plan on-site at least once a year.

Now for those of you who worry that we only cover IBM equipment, not to worry. We have more competitive equipment available, including DEC®, Tandem®, Unisys™ and Stratus®, than anyone else in the business.

The flexible contract.

Believe it or not, we are the most flexible.

When you sign a contract with us, you get one important option you don't get with our competitors. You can get out of it. If for any reason you're not happy after 12 months, you can cancel for a minimal fee. Whereas with our competitors, you're locked in for 5 years, like it or not.



We're so flexible, we'll even let you upgrade or downgrade your contract, at any time, with no strings attached.

And don't overlook the fine print in our competitors' contracts. You'll discover that if your plan covers mainframes, you could pay up to $40,000 just to declare a disaster. With us, there's never any charge. Just a few more good reasons for signing on with IBM.

Nobody's too big, or too small, for IBM.

We want your business, no matter what size business you have. We'll help you work out your own individual plan





We'll even jump through hoops for you.

(we even have consultants who can write the plan for you), and because we are the big guy when it comes to service and support, nobody can take better care of you than we can.

If you need our help internationally as well, IBM Business Recovery Services are available in over 40 countries worldwide.

Which brings us to the bottom line. We think you'll be quite surprised when you discover how affordable our Business Recovery Services can be.

The number to call before disaster strikes: 1-800-365-4426, Ext. 230.

We hope you now have a little different picture of us, and you're ready to take action.

Just send in the attached business reply card or call our 800 number. We'll send you more information and answer any questions you have. Or if you want, we'll be happy to set up an appointment for you with one of our IBM Business Recovery Specialists.

We think you'll find IBM's Business Recovery Services to be more innovative, flexible and competitive than you ever thought possible. After all, we have every intention of becoming the top dog.

IBM®

Business Recovery Services

Provided by Integrated Systems Solutions Corp.

Integrated Systems Solutions Corp. is a subsidiary of IBM. IBM is a trademark of IBM Corp. DEC, Tandem, Unisys and Stratus are trademarks of Digital Equipment Corp., Tandem Computers Inc., Unisys Corp. and Stratus Computer Inc. ©1993 IBM Corp.

Unix videoconferencing: A do-it-yourself proposition

CONTINUED FROM PAGE 49

Inc. workstations for daily videoconferences with co-workers in another building on the university campus.

The cue to videoconference can be quite informal. "You'll be typing away working on something, and you'll hear somebody saying, 'Are you out there?' and you'll say, 'Sure,'" Butler said.

However, every potential participant has preregistered with the videoconferencing software, he said. Sometimes, instead of dialing one another by telephone, workstation users conference-call, using only the audio portion of the videoconferencing link, according to Butler.

Technology link

The same technology can link scientists at Butler's site with scientists in other countries, using the Internet "multicasting" technique, he said. Bandwidth for the multicast is controlled by Internet systems managers, who are still trying to gauge the system capacity needed for workstation videoconferences, Butler said.

The Internet posts a list of "registered" users to let participants know who else is on the line. "The first time I jumped on the multicast," Butler said, "I saw a fellow I knew from Sweden."

> "From a practical point of view, people need integrated solutions."
> —*Jonathan Eunice, research director, Illuminata*

But even the Internet must make some changes to host workstation videoconferences on a regular basis. Stephen Casner, project leader at the University of Southern California's Information Sciences Institute in Marina Del Rey, is one of those developing the IP Multicast protocol, which is being reviewed for use on the Internet by 1995. "We've built a virtual network on top of the physical Internet and use workstations as the nodes that implement IP Multicast," Casner explained. "It would become more commonplace and more efficient if it were in the Internet routers themselves."

Trading one for another

Some user sites have begun to make trade-offs. Some forego full-motion video at 30 frame/sec. for a lower frame rate—which requires less bandwidth but shows up as jumpy motions. Images are shown in an X-Window System on the workstation screen; smaller images demand less bandwidth, users said. Typical workstation conferences may use only 8 to 15 frame/sec.

Among the early adopters are the workstation companies themselves, including Digital Equipment Corp. and Hewlett-Packard Co., both of which use workstation videoconferences to link engineers who work in different states. Sun Microsystems, Inc. has been testing videoconferencing extensively in-house and used it for a Christmas address last year by Chief Executive Officer Scott McNealy that was broadcast throughout Sun's 20,000-node internal network.

Commonplace videoconferencing awaits the installation of high-speed fiber or Asynchronous Transfer Mode networks, greater use of multimedia software and better integration of hardware and software that support it. Until then, build-it-yourself solutions will continue to have a limited appeal.

"From a practical point of view, people need integrated solutions," said Jonathan Eunice, research director at Illuminata, a Pittsburgh research firm. "They're not going to go out and buy a compression card and a camera to make this work."

Two w
make a



If patience is a virtue, it would be tough to find anyone more virtuous than a 386 user.

Of course, you're not waiting to be canonized. You just want to get your spreadsheet crunched, printed and e-mailed before your boss's boss calls you looking for it.

Performance Benchmarks (figures indicate relative performance)	Intel i386	Cyrix 486 Upgrade
MS Excel 3.0	1.0x	2.1x
MS Word 2.0	1.0x	2.0x
Micrografx Designer 3.1	1.0x	2.0x

Benchmarks were run on IBM PS/2 Model 70 (386).

The new Cyrix 386-to-486 Upgrade Microprocessor delivers application performance that's twice as fast. And that's twice as smart.

Now if you had a 486, you wouldn't have this problem. But all that wishful thinking goes out the window when you consider the double-knots on your company's purse strings

Fortunately, there's a smarter alternative to the downward migration path pictured above. It's called the 386-to-486 Upgrade Microprocessor.™ And it's only available from Cyrix,® the smarter microprocessor company.

It's smarter because it's the only single-chip upgrade solution of its kind. And as such, the most cost-conscious way to replace the pedestrian 386 computer you have, with the searing 486 power you want.

Our upgrade chip acts just like a 486, and with good reason. It has Clock Doubling, a 1K on-chip cache

© 1993 Cyrix Corporation. Cyrix is a registered trademark, and Cyrix tomorrow is a trademark of Cyrix Corporation

[redacted]

ZyLab, a division of Information Dimensions, Inc., has introduced ZyImage M/Series, a Windows-based document imaging and retrieval system compatible with Calera Recognition Systems, Inc.'s M/Series.

Calera's M/Series is a reduced instruction set computing-based line of production optical character recognition (OCR) hardware and software systems that the company claimed can perform OCR up to 1,000% faster than competing products.

ZyImage M/Series scans documents, performs OCR and indexes and stores the document image and the optically character-read text, according to Zylab in Buffalo Grove, Ill. With a single mouse click, users can retrieve a document by doing a full-text search. ZyImage M/Series was designed to handle high-volume and time-critical applications including research, litigation support and back-office conversion.

A scanning interface costs $1,995 for a single-user scan station module and $4,995 for a network license.

▶ *ZyLab*
(708) 459-8000

Lysis Corp. in Decatur, Ga., has introduced 2t00, groupware for automation of customer support departments and help desks that use Windows as a graphical user interface.

The product was designed for client/server environments and is a desktop client that communicates with Unix-, Digital Equipment Corp. VAX- or Novell, Inc. NetWare-compatible servers. The support automation software enables users to keep track of outstanding problems until they are resolved, log incoming support calls, find answers stored in an answer base and share information among users in a workgroup.

▶ *Lysis*
(404) 378-3359

Intersecting Concepts has announced DiskMizer, a data-compression utility designed to double the capacity of Digital Equipment Corp.'s VAX hard disks.

The product uses the company's compression technology to develop one or more new Files-11 volumes to store data in compressed format. User applications access the compressed DiskMizer volumes identically to any other Files-11 volume, according to the Agoura Hills, Calif., company. DiskMizer can dynamically allocate space for compressed storage on any VAX/VMS ODS-2 hard disk.

It ships with an array of utilities that provide compression predicting, compression reporting, configuration and control and file-moving functionality.

Prices begin at $349.

▶ *Intersecting Concepts*
(818) 879-0086

Walker Interactive Systems, Inc. has announced Project Cost Management, a system that provides up-to-the-minute information for controlling projects from an operational perspective.

Project Cost Management was designed for distributed computing environments such as Unix-based systems and IBM mainframes, according to the San Francisco company. Its capabilities include monitoring, maintenance, expenditures, closures and handling project initiation. It provides information to support variance and exception reporting, performance evaluation and forecasting and planning.

Project Cost Management is integrated with the company's Accounts Payable, Inventory and Purchase Order Management systems and can integrate with non-Walker payroll packages for real-time access to all project-related data.

Prices range from $250,000 to $375,000.

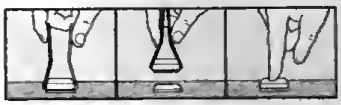
▶ *Walker Interactive Systems*
(415) 496-8811

ays to 386 fly.



and enhanced Cx486 technology. Which means it delivers *twice* the application performance, and 100 percent compatibility with all your software. Like DOS, Windows and OS/2. Even Windows NT. It's also certified software compatible in Novell, Banyan and Lan Manager nodes.

MICROSOFT WINDOWS COMPATIBLE yes It runs with NetWare



Talk about immediate gratification. Just use the chip removal tool provided to pull out your 386DX chip (16, 20, and 25 MHz versions only at the moment), and plug our Cyrix Upgrade Microprocessor into the empty socket. Then get ready for screaming 486 power.

What's more, it's easy to install (it takes all of 15 minutes), and costs under $400. So it's also easy to justify to even the stingiest bean counters.

Every Cyrix upgrade chip comes with the reassurance of a limited lifetime warranty, toll-free telephone support, and a money-back guarantee.

So do the smart thing.

Call us directly at 1-800-46-CYRIX. Quick. Before your old 386 computer inadvertently takes flight.

Cyrix instead™

All other brand or product names are trademarks or registered trademarks of their respective holders.

HOW TO SELL USED EQUIPMENT.

Advertise in Computerworld's Classifieds. They work.

800-343-6474
x744



BRANCH *office* CONNECTIVITY *is* FINALLY *within* REACH

Until today the prospect of integrating a branch office into your corporate network has always seemed hopelessly far off. There are now unparalleled connectivity solutions that bring your branches and headquarters much closer together.

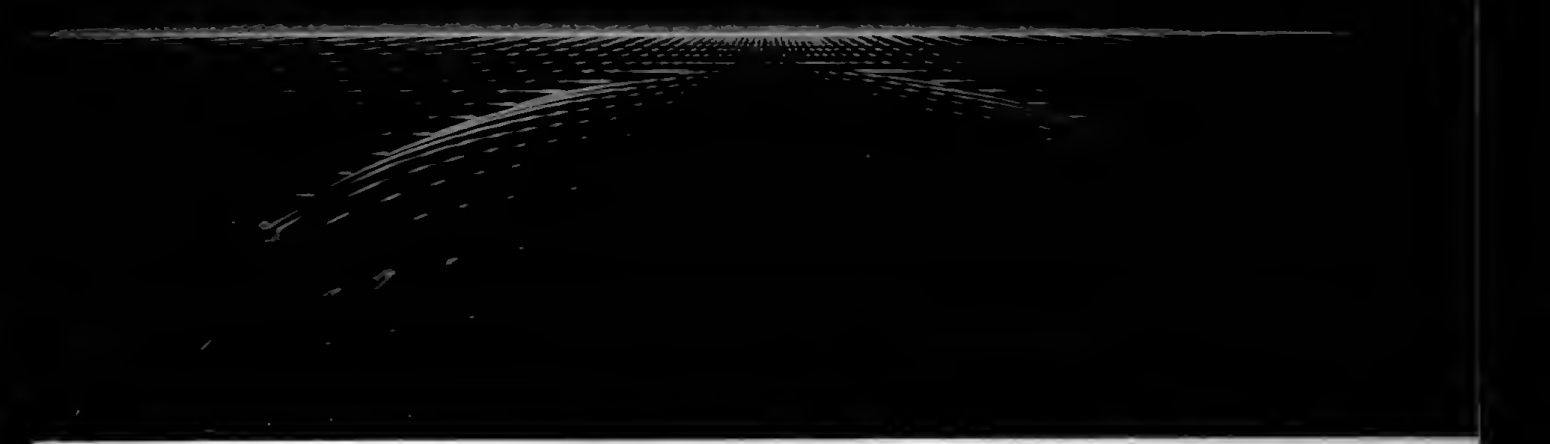
Eicon Technology, a world leader in PC-based connectivity, offers a family of interoetworking and host access products for linking remote offices along with some of the best 3270, 5250 and APPC emulations for use on your favorite PC platform. Eicon's new InterConnect Server extends your Cisco, Wellfleet or IBM backbone oetwork across the enterprise. It fuses traditional router and gateway technologies by integrating LAN interconnection for Novell NetWare and TCP/IP networks, access to aoy host, as well as conversion and concentration of non-LAN communications—all supported by comprehensive SNMP network management.



So, if you are interested in connecting your btanch offices—whether they are in San Francisco, New York, or anywhere else in the world—call 1-800-80-EICON for the Branch Office Connectivity booklet.

EICON
TECHNOLOGY

See 1994's new networking products first



Traditionally, ComNet is the launching pad for new networking products and services. It's the first show of the year to showcase the latest technological innovations to help you achieve success in the global marketplace.

In the emerging era of global business, the rewards will go to the companies that interconnect widely dispersed LANs over wide area networks into enterprise systems.

Come to ComNet '94 and discover the networking products, technologies, and ideas you'll use to lead your company into the global age.

- Visit over 450 exhibiting companies and see more than 250 new products.
- Evaluate new high-speed bridges, multiprotocol routers, intelligent hubs, LANs, network management systems, wireless solutions and other hot products on the day they're introduced.
- Get the inside story on developing trends and technologies, like ATM, Frame Relay, FDDI, fast Ethernet, and more.
- Visit LiveNet, a real-world demonstration of advanced enterprise networking in action.
- See productivity-enhancing "anytime/anywhere" communications at the Wireless Pavilion.

A conference program that gives you the global perspective—and the tools to make informed buying decisions.

Choose from more than 20 in-depth tutorials, the Executive Symposium, and over 75 conference sessions to expand your knowledge of today's most critical networking issues. Topics cover the full spectrum of enterprise network products, technologies, design solutions and management methods.

COMNET '94
CONFERENCE & EXPOSITION

Entering the Global Age

January 24–27, 1994 • Washington, D.C.

You'll explore important policy and industry trends. And—new this year—ComNet '94 includes focused learning sessions on the Internet, wireless communications, and desktop applications. Learn from the best minds in the business like keynote speakers Andrew Grove, CEO of Intel, and Bob Metcalfe, the inventor of Ethernet.

Produced by IDG World Expo. Sponsored by *Network World* and *Computerworld*.

ComNet is produced and managed by IDG World Expo, the worldwide leader in professional conferences and expositions for the information technology industry...including ComNet Prague, EuroComNet and ComNet Korea.

ComNet is officially sponsored by *Network World* and *Computerworld*, both publications of International Data Group, the leading global provider of information services on information technology. IDG's research subsidiary, International Data Corp. (IDC), is the leading market research and analysis firm covering the computer field.

Send for your FREE Exhibits Etc.™ Pass today.

There's no obligation. For FREE exhibit hall admission or conference information, return the coupon or call 800-225-4698.

☐ **Please send my FREE Exhibits Etc. Pass, a $50 value.**

This entitles me admission to see over 450 exhibiting companies, LiveNet, the Wireless Pavilion, the NetWare Pavilion, the keynotes and more. Also send detailed conference information so I can make a decision on attending the complete conference program. There is no obligation.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE _____ INTERNET ADDRESS _____

Return to: ComNet '94, P.O. Box 9107, Framingham, MA 01701-9107. For fastest service, fax to 508-872-8237.

CN1

Windows NT.

The difference between us and other computer companies is we actually know something about it.

More than any other computer company, in fact. That's because we've worked with Microsoft since the inception of Windows NT™ to help you make the most of the new operating system. ***Hardware:*** Get Windows NT on the platform of your choice: affordable Intel 486s, high performance Pentium PCs and now available, Windows NT on the DECpc™ AXP 150,™ the world's most powerful PC.

Support: Digital has more Windows NT specialists than any other vendor. Check the partial list above, then call Digital to find out how the world's #1 provider of Windows NT services, systems and solutions can help you implement the new operating system while preserving what you've already got. You want someone to help you learn about Windows NT. Why not pick the one computer company that's not still learning themselves? Call 1.800.210.8322, priority code BKL, for your free "Windows NT from Digital" resource kit or for more information on Digital PCs running Windows NT.

Worldwide Service & Support for Windows NT

Full installation, plus integration of legacy hardware, software, operating systems

Training for managers, end-users, technicians and developers.

Support for downsizing host applications and developing new client/server applications.

24-hour advisory & help desk technical support.

Maintenance available 24 hours, 7 days a week

Multivendor service to support Windows NT on any manufacturer's system or network

Alpha AXP™ software developers program



Now available, the Alpha AXP™ version of Windows NT on the DECpc AXP 150



64-bit AXP,™ world's fastest microprocessor

PUTTING IMAGINATION TO WORK

imagine that. digital

All products referenced herein are trademarks of their respective companies. Products are sold pursuant to Digital's standard terms and conditions. ©1993 Digital Equipment Corporation

AT&T fires wide-area barrage

Seeks to allay user expertise, security concerns

By Joanie M. Wexler

AT&T has been on a mission lately to refine its wide-area network offerings to keep pace with user concerns surrounding network management, security and billing.

Recent AT&T moves include the rollout of a packaged local-area network interconnect and an end-to-end network management offering, as well as backup and administrative enhancements to the AT&T dial-up Information Access Service (IAS).

Targeting users seeking outside wide-area expertise, AT&T introduced AccuWAN late last month. It is a bundled service that combines LAN-to-WAN access equipment and links, T1-and-below-speed WAN circuits and ongoing AT&T network management services down to the network adapter card level. Charges appear on one bill.

The package targets firms shy on WAN expertise or without traffic volumes to leverage Tariff 12 discounts, said Bob Aquilina, marketing vice president of AT&T Accunet services.

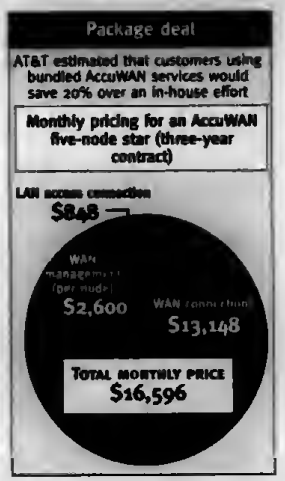
Wide-area needs

For example, beta-test customer White & Case, a New York-based law firm, is testing the service at three sites with an eye toward a possible expansion to its 23 global locations, said Grant Liang, director of information systems.

Liang said his main incentive is having AT&T monitor and help troubleshoot the WAN. "We do have a technical liaison at each remote office, but the expertise is limited," he said.

Aquilina said AccuWAN should save companies 20% over the cost of purchasing and managing the services separately (see chart). Liang pointed out, though, that the "full pricing for AccuWAN has not been defined yet," making cost analysis difficult.

In a separate move, AT&T said it will enhance its IAS dial-up data service for mobile and other remote users in the first quarter of next year. The "950" service allows scattered users to access corporate hosts by dialing one consistent, local, toll-free number from wherever they are.



AT&T plans to add fatter, 56K bit/sec. backup access pipes to existing 9.6K and 14.4K bit/sec. IAS backup. It also plans to add features that will allow central network administrators to remotely add and delete users and monitor call details on a user-ID basis.

Two IAS users, Northwestern Mutual Life Insurance Co. in Milwaukee and Pacific Brokerage Services, Inc. in Los Angeles, said they run a single ID and password for all IAS users, so the per-user administrative features would not apply to them.

However, although Northwestern Mutual already has dual 56K bit/sec. access lines to handle peak loads, and traffic can switch over to one if the other goes down, "it gives us the shivers to run on one line," said Hugh Hoffman, assistant director of IS. "So we would consider the 56K backup."

Similarly, Robert C. Rice, vice president at Pacific Brokerage, said that while he uses Metropolitan Fiber Systems, Inc.'s redundant fiber network for local access, he would be interested because there is always a possibility of an outage.

Meanwhile, in the higher-speed arena, last week AT&T announced a high-speed fractional T3 service aimed at users looking to aggregate lower-speed network traffic. Dubbed "T32," the dedicated offering will provide users looking for circuits less pricey than T3 with about three-fourths the bandwidth (32M bit/sec.) of the carrier's "T45" (45M bit/sec.) T3 service, according to an AT&T spokesman.

AT&T offered the following comparative pricing sample: A 1,000-mile T32 link from Addison, Texas, to Akron, Ohio, would run $55,000 per month, compared with $63,800 per month for a full T3. Neither price includes local access charges.

Rolm taps Windows

In a move that competes somewhat with AT&T/Novell, Inc. efforts to integrate telephone and PC functions, such as consolidating electronic and voice messaging, phone maker Rolm is making strides toward off-the-shelf applications based on Telephony Application Programming Interface (TAPI), a joint Windows-based offering from Intel Corp. and Microsoft Corp.

Rolm is building software modules for its RolmPhone 600 series that support TAPI. TAPI support would allow third-party developers to build PC applications that could interface with Rolm phones, or, via TAPI, other vendors' phones, said Tony Tisset, Rolm group manager for systems marketing.

"This will allow users to go to the market for what they want instead of waiting for Rolm" to develop various kinds of horizontal applications, he said.

According to Jim Burton, principal at consultancy C-T Link in Weston, Mass., both the TAPI and AT&T/Novell approaches will find niches. "If you're a power user, you'll want the kind of [TAPI-based] interfaces Rolm has. But from an administrator's point of view, the server-based approach means you don't have to change anything at the desktop and is more suited to running a call center," he said. —*Joanie M. Wexler*

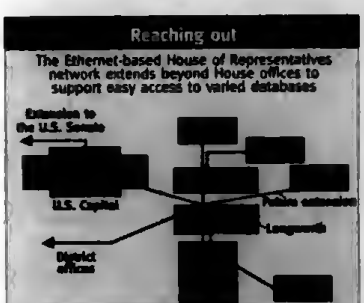
Capitol Hill net moves to client/server

By James Daly
WASHINGTON, D.C.

In the nation's capital, information is power. Those who lack it will do anything to gain it. Those who have it guard it ferociously.

Probably nowhere in this city is that quest for knowledge more acutely realized than in the halls of Congress, where the difference between knowing and not knowing can mean victory or defeat for amendments, entire bills or even congressmen on Election Day.

At the House Information Systems (HIS), the computer technology center of the U.S. House of Representatives, 254 staffers employ a $21.5 million annual budget to make sure every legislator is on equal informational footing.



It is a demanding task, said Hamish Murray, HIS director. "We have more than 400 members of the House, and every one of them needs to be treated like a CEO," Murray said.

That is getting easier these days, thanks to the installation of a new client/server-based informational system called Integrated Systems and Information Services (ISIS). The system, completed in January, provides congressmen and their staffs with an open door into government and legislative data that for years had been buried in a thicket of technology.

Plugged in

For nearly 15 years, HIS' chief informational bloodline has been the IBM host-based Member Information Network (MIN). The network provides approximately 12,000 users on Capitol Hill and hundreds of district offices nationwide with on-line access to a broad array of information resources. These include wire service news, regional demographic and statistical analyses as well as detailed information on legislative activity in the House.

Using MIN, members can pull up a wide variety of information, such as unemployment figures in their congressional district or the schedule for the upcoming week's floor action.

"Everything [is] in there, but it sometimes [isn't] all that easy to find," said Jack Belcher,

Capitol Hill, *page 68*

ON SITE

U.S. House of Representatives
Washington, D.C.

Challenge: To simplify data retrieval and manipulation for House members and staffs.

Technology: IBM ES/9000; Sun 690 server; Ethernet, NetWare and Macintosh networks.

Benefits: Common access to networks through single gateway.



Some people will try almost anything to speed up the leap to client/server.

OBJECTVIEW In the rush to develop client/server applications, many people are going to extremes. But the smartest people are going to ObjectView from KnowledgeWare.® What's so smart about choosing ObjectView? For starters, unique built-in features and non-proprietary scripting options provide power and accelerated development. Superior application performance confirmed by independent tests. Workgroup development and object-oriented techniques. Plus support, training and consulting services to guide you through all phases of client/server development.

Only ObjectView shortens time to production, leverages your programmers' current skills and delivers powerful client/server applications on any scale. Don't settle for less functional tools like SQL Windows or PowerBuilder. Compare useability. Compare code generation and performance. Compare price.

Compare support. You'll find there really is no comparison to ObjectView.

KnowledgeWare®
Solutions At Work

NetView for Alpha plans remain unsettled

By Craig Stedman
MAYNARD, MASS

Digital Equipment Corp. is still putting together concrete plans for migrating users of its DECmcc network management software to IBM's NetView/6000 platform, which Digital recently licensed as the network manager for its Alpha AXP systems.

Digital said it expects to provide more details on the shift to NetView/6000 next month. But first, the company has to settle on a marketing and development strategy for NetView/6000, including a firm schedule for adding various Digital-plus support for terminal servers and wide-area network bridges, will start being added "over the next couple quarters," Biedrzycki said. However, the exact schedule of the rollout is still being plotted.

Pricing deals are planned for DECmcc users who want to move to Polycenter NetView, but the scope of the discounts has also not been finalized, Biedrzycki noted. Likewise, Digital is not providing details on migration tools that it said will convert databases from DECmcc to Polycenter NetView.

Meanwhile, only about half of the 50 or so applications developed by Digital for DECmcc are likely to be ported over to the NetView/6000 platform, Biedrzycki said. The company is reviewing the applications and is close to deciding on which ones will be left behind, he added.

Changing horses

After five years of pushing its DECmcc network manager, Digital is switching to IBM's NetView/6000 technology for Alpha AXP systems in order to gain access to more third-party applications than it was able to attract to DECmcc



specific management functions to the IBM technology.

"We don't have a specific plan right now that we're able to hang our hat on," said Dennis Biedrzycki, marketing manager for Digital's Polycenter management product line. Also still being worked out is a sharp cutback in the company's roster of network management applications, he added.

The first Alpha release of NetView/6000, which Digital will market as Polycenter NetView [CW, Aug. 30], will include support for DECnet Phase IV networking protocols when it ships in the first quarter of 1994 for use with the company's DEC OSF/1 operating system, Biedrzycki said.

Capabilities for managing DECnet/Open Systems Interconnect and Fiber Distributed Data Interface networks,

Engineering answers

Despite the lack of fleshed-out migration plans, Matt Holdrege, senior network specialist at PacifiCare Health Systems, Inc., a Cypress, Calif., health maintenance organization, said talks with Digital engineers had answered most of his concerns about the transition to Polycenter NetView.

Digital's move to use the IBM technology looks "promising" in terms of getting access to more third-party applications, Holdrege said, and all Polycenter applications important to PacifiCare appear likely to be ported to Polycenter NetView.

"I'm not expecting to lose anything," he said.

Frank Brake, director of international operations for technology business development at Newport News Shipbuilding and Drydock Co. in Newport News, Va., said he also is not worried about the prospect of converting from DECmcc.

The decision to drop DECmcc "was absolutely the right thing to do," Brake said, although he noted that Digital and IBM still have to follow through on their promises as they jointly port NetView/6000 to the Alpha line. "They've got a lot of wickets to go through," he said. "The proof of the pudding will be in the implementation."

"It all sounds good, but they've got a lot of work ahead of them," added Charlie Robbins, an analyst at Aberdeen Group, a consulting firm in Boston.

The DEC OSF/1 release of Polycenter NetView is scheduled to be followed by a version for Microsoft Corp.'s Windows NT in mid-1994 and one for Digital's OpenVMS operating system late next year or in early 1995, Biedrzycki said. He added that Digital decided it made more marketing sense to put OpenVMS third on the porting list.

NetView deal clouds SunNet horizon

Digital's licensing of NetView/6000 is likely to make life more difficult for Sun Microsystems, Inc.'s SunNet Manager platform, analysts said.

SunNet Manager was the leading Unix network manager in unit shipments during 1992 and probably remains ahead of Hewlett-Packard Co.'s OpenView technology, although the two are now "very close," said Richard Villars, an analyst at International Data Corp. in Framingham, Mass.

And with Digital joining IBM and HP in supporting OpenView, the technology on which NetView/6000 is based, Villars and others said the status quo may not remain for long.

"Sun could really get rolled over here," said Wes Melling, an analyst at Gartner Group, Inc., a consultancy in Stamford, Conn. "They're going to have to be a very agile ferret to stand in front of an elephant stampede."

Charlie Robbins, an analyst at Aberdeen Group, a consulting firm in Boston, agreed that Sun is "kind of left holding the bag." Users and software vendors may now focus more on OpenView and its derivatives because of the combined weight of the trio backing that technology, he said.

—Craig Stedman

Internet mail package upgraded

By Lynda Radosevich
SAN FRANCISCO

Qualcomm, Inc., a satellite communications company here, has introduced an updated commercial version of its electronic-mail software that is currently available for free on the Internet.

Called Eudora, the product adds a price tag, new features, service and support to the free package.

The main benefit of the package is its ability to send E-mail between PCs and Macintosh computers across Transmission Control Protocol/Internet Protocol networks (namely the Internet) without using translation software or dedicated servers.

Shipping this month, the Macintosh version's features include AppleEvent support and drag and drop attachment. The PC version supports Multiple Document Interface, a Windows feature, and is expected to ship near the end of the year.

Both versions offer message filtering as well as the ability to transport Multipurpose Internet Mail Extension documents.

The software costs $50 per user for fewer than 10 users and sequentially less for additional users.

Ethernet beckons telephone apps

By Joanie M. Wexler
ATLANTA

It will not be long before a corporate telephone call center can participate as a node on an Ethernet local-area network.

In a bold telecommunications/information systems integration move, San Jose, Calif.-based Aspect Telecommunications ventured into IS territory recently at the Incoming Call Center Management Conference here. The voice-oriented vendor unveiled a product suite for its CallCenter automatic call distributor (ACD) aimed at giving business managers a look at both real-time and historical telephone activity from their LAN-based PCs.



Aspect Telecommunications' *EnterpriseAccess gives LAN-based workers a view into the call center*

ACD is software that runs on a private branch exchange (PBX) or, as in Aspect's case, a software/hardware system that plugs into a PBX to route and distribute incoming voice calls. ACDs are prevalent in firms that base much of their business on telephone contact, such as airline reservation systems, catalog companies and technical support departments.

The purpose of Aspect's SQL-based EnterpriseAccess platform and corresponding Windows-based applications is to allow business users to monitor and analyze telephone activity as they would any piece of data factoring into the decision-making equation, said Roger D. Bacon, Aspect vice president of marketing. "For example, your workstation could tell you the call center is running 4,000 calls per hour since an ad campaign broke," he said.

One current CallCenter customer said the timing of EnterpriseAccess' arrival is "excellent for our needs. Our marketing representatives want to know more and more about call activity; they want to look at a screen and know how many calls are coming in," said Michael Clarke, telecommunications supervisor at Intuit, a Menlo Park, Calif., software maker.

This data is provided in most companies on a per-request basis, in report form, by the telecommunications staff.

However, "We're seeing a whole new kind of IS manager emerging: one who simply owns applications," said Nancy Jamison, senior industry analyst at research firm Dataquest, Inc. in San Jose, who said Aspect has "raised the bar" in reporting real-time statistics. "This [voice] will become just another application."

With the Aspect approach, executives should be able to see instantaneously how a Christmas coupon is performing or quickly change staffing to accommodate a call-flow shift if an airline suddenly slashes prices, she said.

Working in the other direction, corporate technical support staff receiving queries or complaints in the call center could "pop off a question to an engineer over the LAN while the caller is on the line, rather than having to call him back," she said.

The first iteration of EnterpriseAccess products is slated to ship in the fourth quarter, including the following:

- A $2,000 Ethernet Transmission Control Protocol/Internet Protocol link from the Aspect CallCenter to a company's LAN for viewing real-time activity.
- A $2,000 sister product for accessing after-the-fact call information.
- CustomView, a $t4,995 Windows application development tool that allows a PC user to create customized views of call transaction events in progress.
- CustomView Director, $595, which lets users display these views on their PCs.
- CustomView Editor, a spreadsheet-based graphical report generator for historical information.

The EnterpriseAccess architecture "lets us take anything happening on the telephony side and plug it into the IS side of the house," Bacon said. He added that this will likely include Simple Network Management Protocol-based management for blending call center and networked systems management by late 1994 or early 1995.



Phones, LANs do mating dance

Several companies participate in the computer-integrated telephony market, including IBM with its CallPath product. Such one-way, system-specific software connects incoming calls to corporate databases, a first step for merging IS and telephony with emphasis on faster call handling. In addition, firms such as San Jose, Calif.-based VMX, Inc. have announced voice-mail applications for LANs that let users store voice-mail as messages on their PCs.

Briefs

HP PC cards

Hewlett-Packard Co. announced Net Advisor PC Cards that are said to turn PCs on a Token Ring or Ethernet local-area network into analysis stations that can decode in real time a wide range of LAN protocols, such as Novell, Inc.'s IPX and Banyan Systems, Inc.'s Vines IP. An expert system is said to help the user identify network faults faster. The cards support Intel Corp. 80386- and 1486-based PCs. They are priced at $12,000 for a Token Ring or Ethernet card.

McData gateway

McData Corp. in Broomfield, Colo., announced enhancements to its LAN gateway to IBM Systems Network Architecture (SNA) hosts, based on Novell's NetWare for SAA. McData's Advanced SNA/IP Gateway supports SNA on top of Transaction Control Protocol/Internet Protocol (TCP/IP) so that NetWare for SAA clients can access hosts over an existing TCP/IP backbone, according to McData. Slated to be available in the first quarter of 1994, the package will be priced at approximately $1,500.

Bundle eases remote communications

By Michael Fitzgerald
BOTSELL, WASH

In what could give users a way to eliminate mixing and matching separate software programs for modem, fax and remote system access, Traveling Software, Inc. has announced CommWorks for Windows, a package with five software utilities in one.

The five utilities in CommWorks for Windows are the following:

- **LapLink V**, its latest file transfer program.
- **LapLink Remote Access**, a two-way access program for remote users that runs in the background, allowing the system to be accessed while it is in use.
- **TS Fax**, which lets users annotate, send and receive faxes.
- **TS OnLine**, a communications package.
- **LapLink Alert**, which notifies users when they get items over the electronic transom.

While CommWorks was designed to let users replace their communications packages, such as Digital Communications Associates, Inc.'s CrossTalk modem package or Microcom, Inc.'s Carbon Copy remote access program, any of the five utilities can be deinstalled by users and mixed and matched with existing communications utilities.

Beta-test users credited CommWorks for Windows with making their lives easier.

"Our salespeople are not computer people, and CommWorks has allowed us a safe, easy way to update data," said Thomas Balzarini, "doctor of PCs" at Associated Grocers, Inc. in Seattle. "We'll definitely standardize on this — it's saved us a ton of grief. LapLink is hard to use for the average person, but CommWorks has made it nice and easy."

Feature-rich

"It has a lot of little features that can do good things for people who have notebooks and desktop PCs," Balzarini added. Balzarini said CommWorks seems to have enough solid features so that over time Associated Grocers would probably move to its utilities. For now, however, the company plans to strip out tools such as the modem package.

Traveling Software's goal is to replace communications utilities, said Mark Eppley, the company's chairman and chief executive officer. Eppley predicted that CommWorks was "the first of a generation of multifunction utilities" and that "stand-alone software packages like Procomm and WinFax will go away in the future."

Analysts praised the product and the concept but stopped short of supporting Eppley's contention.

"I don't think [other communications software] is going to get nuked, but it will certainly blur the categories between separate communications utilities," said Brent Williams, PC software program director at International Data Corp. in Mountain View, Calif.

CommWorks is based on Universal Communications Object technology, the communications engine that Traveling Software builds its applications around to allow data transfer among different platforms.

"Nobody has really been able to pull off putting together a bundle of communications products before. People have not been thinking in terms of putting together comprehensive communications offerings," Williams said.

CommWorks will cost $149.95 through year's end if purchased from Traveling Software and $199.95 if purchased from resellers. It costs $69.95 for current Traveling Software users.



Accounting and sales

can't seem

to get in tune.

Marketing

is fiddling around

on their own.



And basically,

everyone seems to be marching to their own drummer.

Sound familiar?

IBM Client/Server



IBM is a registered trademark of International Business Machines. © 1993 IBM Corp.

How do you get everyone working in concert?

To stay competitive, you're constantly searching for better ways to orchestrate the flow of information. How do you get more out of your PCs? How can you make the most of your existing systems? What can be done to streamline your organization? More often than not, the answer is IBM Client/Server.

IBM can develop open client/server solutions that put the combined strength of all

your computer systems to work for you. We have thousands of specialists worldwide who can work with you to custom-tailor a solution that's right for your particular business. And we'll work with you at any stage of the process, from initial consulting to helping you tie everything together—we'll even manage your systems for you.

Whether you're upsizing or downsizing, nobody knows how to ensure systems reliability and security for your "mission critical" applications better than IBM.

We can also help you integrate different types of hardware, software and networks. We have the industry's widest array of software and network products, and we support Distributed Computing Environment (DCE), enabling different computer brands and platforms to work together in harmony.

For more and more companies, IBM Client/Server is the key to getting everyone working in concert. We've done it for hundreds of companies. We can do it for you. For more information, call 1 800 IBM-0045, ext. 10.

There's never been a better time to do business with IBM®

Capitol Hill

CONTINUED FROM PAGE 61

manager of information systems. For one thing, MIN has begun to show its age. For example, much of MIN's Cobol-based code is difficult to maintain. In addition, MIN's command-driven interface places heavy demands on HIS instructors who are already stretched by a member/staff turnover rate averaging 40% a year.

Worse still, information is distributed across 80 separate databases on a wide variety of hardware and software. As a result, MIN users have to know in advance which databases have the information they need, and they are often required to enter and exit multiple MIN applications to meld related pieces of information into a coherent whole.

Nearly three years ago, the HIS embarked on a project to migrate the IBM Enterprise System/9000-based MIN to the client/server design of ISIS.

Transparent access

"What we're trying to do with ISIS is let users stay in one application and go off and get information from another application without needing to know where the information is coming from," said Kathy Bye, deputy manager for the customer applications group.

Although ISIS was first developed for the Sun Microsystems, Inc. platform, HIS would have needed to port it to the VAX/VMS platform soon thereafter. HIS was not switching platforms but rather had to develop it on the Sun platform and make sure it worked before deploying it on others.

Because HIS had chosen Sybase, Inc.'s software as the database engine, it began using Sybase's APT Workbench. However, the fit turned out to be awkward. "APT is very transaction-oriented, meaning you'd pull down entire files instead of just rows of specific data," said Jim Daley, HIS database administrator. He added that he also found APT's programming interface difficult.

Instead, HIS switched to JYACC, Inc.'s JAM application builder, "which allowed us to do things with far less code and emphasized our information retrieval process," Daley said.

Congressional passageway

In September 1991, client development began in earnest and by this past spring, ISIS was providing the 103rd Congress with a single doorway into an elaborate informational network.

The House Internet supports more than 2,300 end devices on a wide range and growing number of computer systems. It comprises more than 150 Novell, Inc. NetWare networks, 35 Macintosh networks, 12 Digital Equipment Corp. VAX computers and eight Unix computers. There are more than 125 terminal servers, with a potential of 10 connections each.

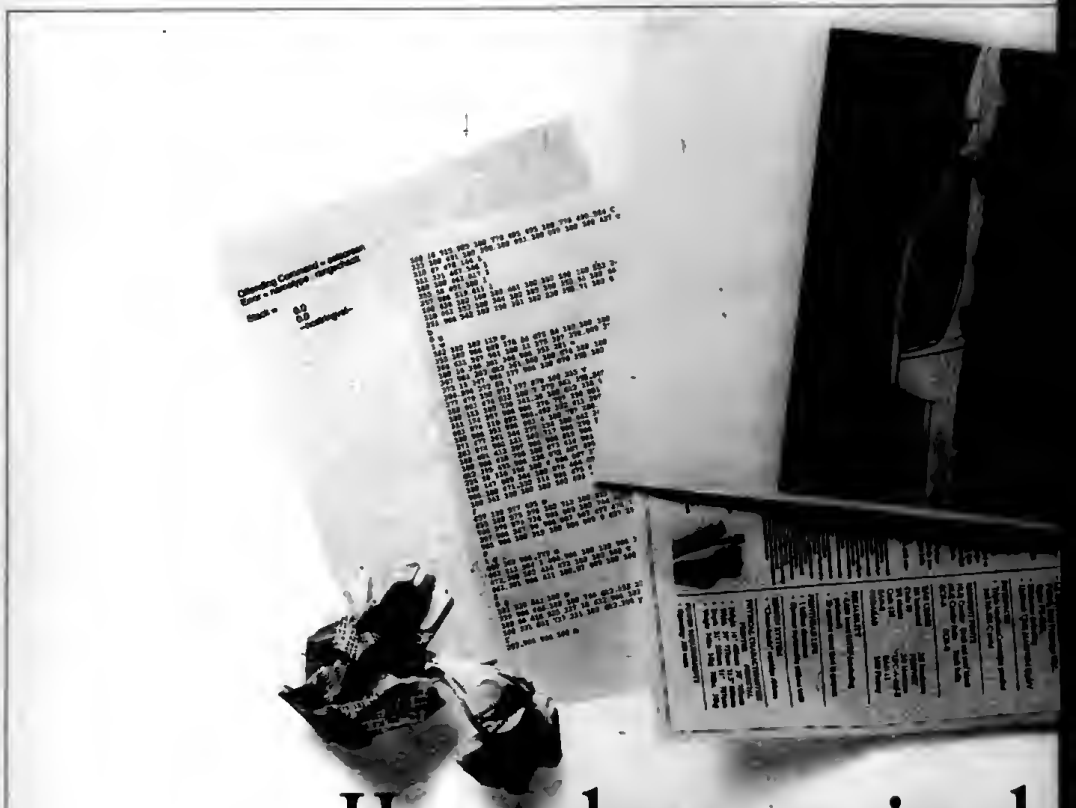
ISIS is organized using a "library" metaphor, with individual resources grouped within "bookshelves," or functional areas. For example, users on any of the more than 3,000 nodes on the House Ethernet can dial into the Newswire's "library." From there they can travel to the Associated Press and Reuters "bookshelves" and then finally pull down the story they are looking for.

Users no longer need to jump from one database to another to complete a task, Belcher said. "All related information is accessible from within one application," he noted.

Access to ISIS is available on a range of devices from low-end terminal displays through high-end PCs. Daley said they needed to build user interfaces for low-end clients on terminals attached to the Sun 690 server and midlevel clients on Digital terminals attached to VAXs.

The system can be custom-tailored to gather information that may be of specific interest to particular legislators. For example, San Francisco Congresswoman Nancy Pelosi may want to get news about earthquakes, while Dan Rostenkowski of Illinois may be interested in information about crop subsidies.

Users can still access information in MIN through a split-screen process, Belcher said. But as more information is moved from MIN into ISIS, MIN may become less important to users. "MIN is still operational and probably always will be," he said. "There are still people who just want to get in, grab a specific file and get out. But clearly, ISIS is the way of the future."



How to keep a mixed from becoming a mixed-

VPT Network Architecture

Sharing printers can be a real headache. No matter if it's emulation sensing, page orientation or resolution settings, something always seems to be going wrong. In fact, up to 50% of trouble calls to network administrators are printer related.

That's why we developed VPT™-Virtual Printer Technology™- and incorporated it into our new LZR 1580 and LZR 2080 network laser printers. VPT is a revolutionary new network architecture that enables a single printer to become 64 individually configured "virtual" printers.

For example, VPT allows one virtual printer to handle only PostScript™ files, while another takes care of PCL files, eliminating emulaton sensing problems. A third virtual prioter might automatically default to a line printer font in a landscape orientation, and so on. The choices are yours.



"It takes network printing one step beyond what any supplier has done so far."
—Bill Gott, InfoCorp, as quoted in InfoWorld

VPT provides users the benefits of having their very own printer while giving network administrators maximum flexibility and control. It also lets users access the more advanced features of

© 1993 Dataproducts Corporation. Dataproducts and Dataproducts with its associated logo mark are registered trademarks. LZR, Virtual Printer Technology, VPT, the VPT logo and the Dataproducts tagline are trademarks of

Peer Networks in Santa Clara, Calif., has announced Torpedo.

The software add-in program is said to enable network administrators to use the commands of Lotus Development Corp.'s 1-2-3 spreadsheet to perform Simple Network Management Protocol (SNMP)-based network management.

Torpedo contains libraries that implement Lotus @ functions and macros that implement SNMP gets, sets and traps, which are used to set thresholds and collect management data from managed devices.

A Microsoft Corp. Excel version of Torpedo is scheduled for release at an undisclosed date.

Torpedo costs $10 per copy when bought in volume.

▶ *Peer Networks*
(408) 727-4111

Delrina Corp. has announced Delrina WinFax Pro for Networks, network-based fax software designed for Windows users.

According to the Toronto company, the product enables all users on a network to send and receive faxes directly from their PCs by sharing one or more standard fax modems.

Delrina WinFax Pro for Networks does not require a dedicated server. It uses any standard Class 1, Class 2 or Intel Corp. fax modem and WinFax Pro 3.0 fax communications software as its front end. The software is scalable.

Delrina WinFax Pro for Networks costs $399 and comes with a base package that includes two copies of network-capable WinFax Pro 3.0 and WinFax Pro for Networks Server.

▶ *Delrina*
(416) 441-3676

Scopus Technology, Inc. has announced the integration of SupportTeam, a customer service module of the ProTeam system, with the T-Server from Genesys, Inc. The T-Server is middleware that provides a common interface designed to enable easy integration of telephony devices with customer support applications.

According to the Emeryville, Calif., company, ProTeam is groupware that automates and integrates the operations of engineering, technical support, sales and marketing and quality assurance.

Because of the integration, customer support personnel can use devices such as private branch exchanges, automated call distributors, voice messaging systems, integrated voice-response units and predictive dialers for service environments.

A typical configuration designed for five support people and 20 engineers is priced at approximately $40,000.

▶ *Scopus Technology*
(510) 428-0500

ProTools, Inc. has announced support for distributed IBM Systems Network Architecture (SNA) environments.

According to the Beaverton, Ore., company, the ProTools Network Analysis series can now perform console-agent network analysis across interconnected SNA networks in conjunction with IBM's Communications Manager/2 and AnyNet/2 products.

ProTools' Network Analysis series offers Foundation Manager, which is a stand-alone analyzer and Systems Network Management Protocol Remote Monitoring (Rmon) management information base manager for up to 256 networks.

Two agents are also provided: Cornerstone Agent, a Rmon agent plus real-time analyzer; and ProbePlus, a hardware-only Rmon agent.

Foundation Manager costs $10,795. Cornerstone Agent and ProbePlus cost $1,550 and $3,995, respectively.

▶ *ProTools*
(503) 645-5400



environment printer up environment printer.

our printers, regardless of the limitations of their application drivers.

With VPT, the LZR 1580 and LZR 2080 simultaneously support more major network operating environments than any other network printer. Plus, unlike some network printers, they are completely compatible with your host operating systems. So there's no need to replace any of your network or system software.

They're also SNMP compliant, so they can support a variety of network management programs. And an optional PostScript fax modem is available, so users can easily send and receive plain paper faxes up to 800 dpi. In short, they're everything network printers were meant to be.

So call 800-334-3174 for our free booklet, *"VPT. An Intelligent Approach to Network Printing."* And find out how we've made sharing printers virtually painless.

ENGINE SPEED	MAXIMUM RESOLUTION	MAXIMUM PAPER SIZE
15 and 20 ppm	800 x 800 dpi	11"x17"
OPERATING ENVIRONMENTS		
Novell NetWare, Apple EtherTalk, Apple A/UX, VAX VMS, ULTRIX, MicroRSX, DECNET DOS, SunOS, HP UX, IBM AIX, AT&T System V, Interactive Unix System, SCO Unix, Tandem NonStop-UX, ICL System V, Bull B.O.S. Unix, Data General dgux, Unisys System V, Berkeley UNIX, Tadpole TPIX, Wollongong WIN/TCP (Support for Microsoft LAN Manager, Windows NT, and IBM Token Ring coming soon.)		

Dataproducts.
The high performance printer people.
Group Hitachi Koki

Dataproducts Corporation. All rights reserved. PostScript and Adobe are registered trademarks of Adobe Systems Inc. The named network operating environments in the above table are all trademarks of their respective owners.

DO YOU SELL OUTSOURCING?
Advertise in Computerworld's Time and Services Classifieds. They work.
800-343-6474
x744

Can I get the perfect network solution *and* someone to keep it that way?



Think of every Novell Authorized Reseller as two highly trained individuals in the same body.

One is a salesman (there, we've said it) who knows he has the best networking products

Authorized Gold Platinum

The Novell Reseller Channel has three levels to provide everything from basic networking solutions to complex, enterprise-wide systems

available and can't wait to put them to work for your company.

The other is a business partner who knows that some day your network may have to be reconfigured or expanded. And you're going to need help to do it right.

The Novell Reseller Channel is a unique sales and support infrastructure designed to meet a range of needs. Their staff can provide you with strategic consulting to assess how technology can meet the ongoing needs of your business, whether you're networking a small group of PC users or establishing a host to network link service.

Does this vast store of technical expertise make them good salesmen too? You bet it does.

Call us at 1-800-453-1267, extension 5205, for a nearby reseller that fits your needs.

yes NetWare

NOVELL. The Past, Present, and Future of Network Computing.

Novell Resellers are independently owned and operated businesses.

Managing distributed systems dilemmas

By Johanna Ambrosio

Some users faced with a herd of scattered systems have begun adopting real solutions for managing them.

From tracking storage and work load across machines to determining a systems management architecture for the next decade, here is a look at three users who have tackled, or at least started to address, the distributed systems management beast.

Framework feat

In April, Tektronix, Inc. in Beaverton, Ore., began testing its Compute Systems Environment (CSE), a framework that defines and standardizes applications and interfaces for end users. It does pretty much the same for back-room operations, including systems management.

Bryce Schroeder manages technical computing for two Tektronix business units. His 22 employees support some 1,200 end users on 600 Sun Microsystems, Inc. Unix-based machines and 500 X Window System terminals.

Explanation time

"In a distributed environment, you're lost without tools and diagnostic capabilities. And it doesn't make the end user very happy when you can't tell him what the hell went wrong." — *Bryce Schroeder, Tektronix*

"CSE will deliver the same tools and data sets to every desktop inside the environment, so the engineer will see the same project information no matter where he or she sits," Schroeder said. "A consistent backroom environment comes along with it."

That back-room portion calls for five servers dedicated to specific tasks, including systems management, a general-purpose machine that hosts applications, a file server, a compute server and a database server.

Tektronix adopted this approach, Schroeder said, because "we need to provide consistently high performance, and the only way to do that is to tune. But you cannot tune in a distributed environment unless you can segment things into pieces."

All the software Tektronix uses for that task will reside on the systems management server. This includes Rdist, a Unix tool that provides copy and revision control across the network, and Sun's Network Information Service, which comes standard with the operating system and handles things such as password updates.

Other systems management tools include help desk software — the company is replacing its homegrown software with a package — and Tivoli Systems, Inc.'s Tivoli Management Environment, an object-oriented framework that includes applications and services.

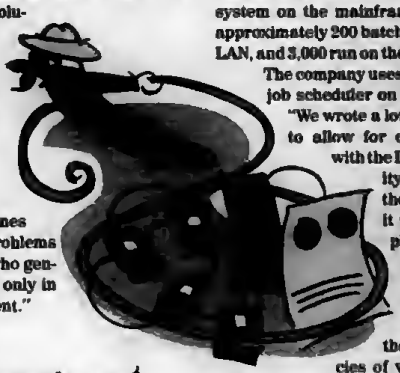
CSE goes into production this month; Schroeder said he hopes to have it rolled out to 75% of his end users by next June.

Data, data everywhere

You might reason that any organization using Convex Computer Corp. machines as dedicated file servers wants its data delivered quickly, and you would be correct. End users at Sandia National Laboratories in Albuquerque, N.M., access their data from disk at speeds of 50M bit/sec., according to Sue Kelly, a technical staff member in charge of storage services.

The production network includes two separate networks — one for classified work and the other for unclassified projects. Some 600 machines, evenly split between the two environments, include Hewlett-Packard Co. workstations, Sun machines, Digital Equipment Corp. VAXs and Cray Research, Inc. supercomputers. Each network has one Convex as a file server.

The lab uses OpenVHSM, a package from OpenVision in Pleasanton, Calif., to help get data from any machine to a user who requests it. "End users need to know the file name, but they don't have to know where it is stored," Kelly said. "They do have to be cognizant that if the file was created on a VAX and is being read on a Sun, they need to do some manipulation because of different data formats. We don't have a solution for that."



Because most of the end users are technically savvy engineers, Kelly said, "We do stand a chance. The ones that have problems are the ones who generally operate only in one environment."

LAN management

A few years ago, an end-user department at Provident Life & Accident Insurance Co. in Chattanooga, Tenn., began developing mission-critical business systems on PC local-area networks.

"They came to us and said they'd like some support," recalled Rick Reynolds, manager of operations support. Now the information systems group provides systems programming, scheduling and database support — "really the whole gamut," he said. Reynolds' specialty is scheduling batch jobs on both the mainframe and the PC LAN, which in this case runs under OS/2.

The mainframe and LAN worlds are intertwined, Reynolds said, because the results of some of the jobs run on the LAN — writing checks, for example — are sent up to the company's main financial system on the mainframe. Each night, approximately 200 batch jobs run on the LAN, and 3,000 run on the mainframe.

The company uses IBM's OPC-ESA job scheduler on the mainframe. "We wrote a lot of custom code to allow for communications with the LAN and the ability to start a job on the LAN and track it through to completion," Reynolds said. Also, the mainframe scheduler maintains the rules and policies of what runs when and where.

In addition to writing extensions to the mainframe package to handle LAN scheduling, Provident wrote a file-transfer program to move data quickly between the host and PC worlds. "What you get with OS/2 is OK if you want to move a word processing file," Reynolds said, "but if you want to do backups or anything large, you need high-volume data transfer."

Although there were some commercially available packages, Provident decided to do this part itself because "we were interested strictly in OS/2 and MVS — not HP or DEC or anything else — and we found we could write something that performed faster," Reynolds said.

HP to expand HP 3000 line at Interex

By Mark Halper
SAN FRANCISCO

Compared with Hewlett-Packard Co. HP 9000 Unix minicomputer users, HP 3000 customers are like ambivalent movie fans who can wait for the videotape release of the latest feature film.

That may explain why the HP 3000 development shop, with its MPE/IX operating system, sometimes trails the Unix 9000 side in new product announcements.

That trend will hold true later this month, when HP is expected to add models to the 3000 line with component specifications that mimic machines HP introduced to the 9000 series last June.

The introductions will coincide with the annual conference here of HP user group Interex, during which a number of software and third-party companies are also expected to unveil newwares.

In suspense

One mystery surrounding the conference is whether HP will choose this forum to take the wraps off its most powerful minicomputers ever — Corporate Business Systems that scale up to eight processors using the latest version of HP's Precision Architecture-RISC chip, the Model 7100.

HP is expected to boost the Corporate Business System series, which includes both Unix and MPE architectures, before the end of its fiscal year on Oct. 31 [CW, Aug. 9].

But one bit of hardware news is almost certain to emerge at the Interex gathering: HP will add boxes to the 3000 line that will incorporate some of the features it added to the 9000 in June.

Like the 9000 boxes, the new 3000 machines are expected to raise performance levels without raising price tags.

Furthermore, users said they expect HP to add dual-processor models to the 3000 line, much as it did in June to the 9000 series, when it also added more 7100-based machines.

An HP spokeswoman confirmed that the company is planning to introdnce 3000 machines during the Interex show, but she declined to provide details.

HP maintains that its 9000 customer base is more interested in leading-edge technology than its 3000 nser base because 9000 users tend to build their own solutions whereas 3000 users are often content to buy packaged solutions.

Industry watchers further explained that in the 9000's Unix world, HP is under more pressure to provide the latest and greatest goods because the firm faces more competition there than in the market for its relatively proprietary HP 3000.

HP, *page 78*

If this is how your computer does Windows, have we got a PC for you.





Don't wait. Put one of our Image™ Series 486 PCs on your desk immediately. You'll get Windows performance that really screams.

And we're not the only ones who feel that way. In a recent review of the Image Series, *PC World* wrote, "Say goodbye to waiting in Windows."

NEC pioneered local bus video technology to speed up graphics-based applications like Windows. Today, as other makers develop first-generation local bus video, we offer advanced, second-generation technology

Making it fast. Our ingenious Image Video™ technology combines second-generation local bus video with a powerful graphics accelerator, so even the most complex, most demanding graphics applications run full blast. And with our True Color support for over 16.8 million colors and photo-realistic images, those applications will have the impact of a speeding freight train. The bottom line: Your productivity takes a fast turn skyward. Our new Image PCs are built for easy, 238-pin ZIF-socket upgrades to the next generation of Pentium-based Intel OverDrive™ processors. We've also given them an on-board SCSI II interface, for quick connections to a wide range of peripherals.

But wait: it gets even better. In addition, NEC's OptiBus™ technology can make those peripherals perform up to 30% faster than ordinary systems. While our ImageSync™ feature delivers flawless, flicker-free images with no adjusting when used with one of our award-winning MultiSync® FG™ monitors.

The NEC Image Series. Just part of a whole family of great personal computers, from our affordable PowerMate® PCs, to our expandable Express™ servers. So (why wait?), call 1-800-NEC-INFO or NEC FastFacts™ at 1-800-366-0476, request document 46243.



MultiSync, and PowerMate are registered trademarks and Image Video, ImageSync, Express, FG, OptiBus and FastFacts are trademarks of NEC Technologies Inc. The Intel Inside logo is a registered trademark of Intel Corp. All other trademarks or registered trademarks are the property of their respective holders. © 1993 NEC Technologies Inc.

NEC GSA#GSOOK1AGS5241

intel inside

PC WORLD BEST BUY

NEC Image 466
May 1993

IMAGE VIDEO

Because ⬆ is the way you want to go.

NEC

Growth spurs IS overhaul at Snapple

By Thomas Hoffman
VALLEY STREAM, N.Y.

Until recently, information technology took a backseat at Snapple Beverage Corp. while the company enjoyed a dizzying climb to the top ranks of the beverage industry. But dramatic growth — and accelerated competition — have recently forced the company to alter its view of information technology.

Snapple, founded in 1972 as Unadulterated Food Products, Inc. by a handful of Brooklynites with a vision of selling all-natural fruit drinks to health food stores, catapulted onto grocery store shelves across the U.S. and into the hearts of Wall Street investors. The company, whose sales have doubled every year since 1988 to $232 million last year, has watched its stock price soar to $58 per share since its initial public offering of $20 per share last December.

Snapple has seized a commanding share of the $750 million U.S. ready-to-drink iced tea market. That industry, now flooded with entrants looking to cash in on the "New Age" beverage craze sweeping the country, will likely double in size by next year, according to Tom Pirko, president of BevMark, Inc., a Los Angeles-based beverage industry management consultancy. It is only one of several sectors where Pirko and other analysts expect tougher competition for Snapple.

Snapple will "have to be cutting-edge in the information systems revolution. They're going to have to be superintelligent and lightning-quick in their planning. It's as much an information game as it is a product game," Pirko said.

Snapple recently installed a distributed networked architecture to help meet those requirements. Late last month, it replaced an aging McDonnell Douglas Corp. mainframe system with a PC-based network designed to provide electronic data interchange (EDI) and material requirements planning (MRP) links to its co-packagers and distributors, said John-Philip Galinski, director of MIS.

Snap to it

Despite its impressive growth, analysts expect $232 million Snapple to face increased competition from partnerships between Coca-Cola Co. and Nestle SA, not to mention Pepsico, Inc.'s ties with Thomas J. Lipton, Inc.

The mainframe, removed last month, had been used to support Snapple's sales, marketing and back-office functions. Until last fall, Snapple did not even have an IS department. Those operations were overseen by the company's founders, controller and marketing department — hardly the type of IS strategy expected from an up-and-coming market force.

But that mind-set began to change in April 1992 when Unadulterated Food Products became Snapple Beverage Corp., after company founders Arnold Greenberg and Leonard Marsh teamed with Thomas H. Lee Co., a Boston-based leveraged buyout firm that paid $130 million for 61% of the company.

With competitors looming on the horizon, Greenberg and Marsh addressed Snapple's IS leadership gap by recruiting Galinski, who had been with the IS staff at Cablevision Systems Corp. in nearby Woodbury, N.Y.

Galinski moved quickly to develop an IS strategy for the firm, starting with a plan to tighten its ties with suppliers.

Because Snapple does not manufacture or distribute any of its products, the company required tighter communications links with the 16 to 24 bottlers that supply more than 300 distributors at peak season in the summer. So the company decided to replace the McDonnell Douglas system with a Novell, Inc. NetWare v3.11 network operating system capable of providing MRP and EDI connectivity from headquarters to those sites, according to Galinski. Snapple had no prior electronic connectivity with its manufacturers or distributors.

A manual past

In the past, Snapple communicated with its manufacturers and distributors over the telephone and entered the information manually onto the mainframe. With the EDI and MRP links, Snapple will be able to automatically download that information daily from its constituents by linking with them through dial-up modems and T-1 connections.

Overall, the PC-based network will cost Snapple approximately $500,000. The system, which includes Cabletron Systems, Inc. smart hubs, a mix of 150 Intel Corp. 80386-based PCs and an as-yet-undetermined set of network superservers, is a more cost-effective route than the IBM Application System/400-based manufacturing and accounting system that Snapple had pondered, Galinski said.

For example, Galinski said Snapple had considered Lawson Software's Lawson Accounting System package for an AS/400 platform, but the software alone would have cost Snapple $700,000 and required full-time on-line connectivity, he said.

Instead, Snapple took an alternate route with the PC-based network that will allow distributors and manufacturers to process their own information locally. The heart of the system, Galinski said, will be Computer Associates International, Inc.'s Accpac Plus for DOS accounting software.

"The MRP system includes advanced algorithms that will help us forecast demand for different Snapple flavors in various regions of the country," Galinski said. "It's more advanced than anything I've seen with any AS/400 software."



Snapple's John-Philip Galinski *wants 'cutting-edge' IS*

ON SITE

Snapple
Valley Stream, N.Y.

Challenge: To replace an aging mainframe system with a PC-based network equipped with EDI and MRP links.

Technology: Novell NetWare v3.11, Intel 80386 PCs, CA's Accpac Plus for DOS.

Expected results: Tighter communications links with its bottlers and distributors.

Cray to release MPP system

By Ellis Booker

Later this month, Cray Research, Inc. will unveil its long-awaited massively parallel processor (MPP) system, the T3D. The new Cray system is based on the Digital Equipment Corp. Alpha chip.

Although Cray declined to provide details in advance of the T3D's formal introduction, the company has said in the past that the first product in its multiphase MPP program would be able to grow to 512 or perhaps 1,024 processors.

Taking the performance of a single Alpha chip and multiplying it by 1,000, this would give a 1,000-processor T3D a performance of approximately 150 billion floating-point operations per second.

As for price, Cray observers predict the T3D will cost between $15 million and $30 million, depending on configuration.

The MPP market into which supercomputer pioneer Cray has stepped is thought by some analysts to be on the brink of significant expansion, with the number of MPP vendors doubling to 30 by next year and the number of systems shipped per year expected to grow from 750 to over 4,000 by 1997.

To date, however, no vendors have succeeded in establishing commercial applications for MPP, which many commercial customers still regard as a scientific research platform.

For Cray, however, this is a nonissue, analysts said.

"Cray is not marketing to the commercial community, which isn't to say they wouldn't like to or might not be planning to," said Michael P. Burwen, president of Palo Alto Management Group, Inc. in Mountain View, Calif. "At the moment, there's no indication Cray is building a business-oriented sales organization." He added that Cray will likely find a strategic partner if it decides to enter the commercial arena.

First of many

The first user of the T3D was the Pittsburgh Supercomputing Center, which said last week it had installed a 32-processor T3D prototype and coupled it to a 16-processor Cray C90, a traditional vector supercomputer. The two machines will work in tandem on problems ranging from global warming to those being addressed by biomedical researchers.

The Pittsburgh center's configuration will be 50 times faster than an earlier configuration, in which a Cray Y-MP supercomputer was linked to a Connection Machine CM-2, the MPP system from Thinking Machines Corp.

"The tight coupling between the T3D and C90 will make it much easier to exploit the parallelism of the T3D," said Michael Levine, co-scientific director of the center. As is the common practice at academic supercomputing sites, the Pittsburgh center and Cray will jointly develop applications software for the T3D.

Pittsburgh acquired the T3D with funds from the Commonwealth of Pennsylvania, the National Science Foundation, the Defense Advanced Research Projects Agency and the National Institutes of Health.

MOVE FROM WORDPERFECT TO AMI PRO WITHOUT EVER TOUCHING A MANUAL OR A CHECKBOOK.

INTRODUCING SMARTMOVE– GET AMI PRO FOR WINDOWS FREE FOR 25% OF YOUR CURRENT DOS WORD PROCESSING USERS.

GET AMI PRO FREE

If you're considering the move to Windows™ word processing, you should know that software experts and critics from all over are talking about Lotus® Ami Pro® 3.01 for Windows, part of the award-winning suite of Lotus Windows applications. The consensus is that no word processor makes the move easier or more rewarding. Period. In fact, according to *PC World* (3/93), 'Users moving from DOS can fearlessly choose the latest Ami Pro version.'

That's a strong claim. But we're so confident you'll agree, we're making an equally strong offer. **If you qualify, we will give you Ami Pro software free for 25% of your installed DOS word processing base.*** No wonder we call this offer 'SmartMove.' (See below for qualifications.)



NOTHING MAKES THE MOVE TO WINDOWS WORD PROCESSING EASIER THAN AMI PRO.

If you're working in WordPerfect® for DOS now, you're in for a surprise when you switch to Windows. WordPerfect for Windows actually requires you to learn new keystrokes. In fact, Ami Pro is easier – easier to transition to, easier to learn, easier to work with – than anything else. Ami Pro gives you seamless conversion of all your DOS word processing files (including a one-step batch conversion process). The WordPerfect SwitchKit shows you how to perform a function in Ami Pro when you type in WordPerfect DOS commands. And the QuickStart on-line tutorial makes learning quick and easy. All of which means that Ami Pro gets you up to speed fast – so fast that *Forbes Magazine* (2/1/93) reports, 'You can learn to use Ami Pro... in about a day. Put the manual in a drawer as the first step.'

SMARTMOVE GIVES YOU THE BEST WINDOWS WORD PROCESSOR AT THE BEST PRICE EVER – $0.

Right now you can get the Windows word processor all the critics are raving about at a low, low cost of zero dollars. Just call **1-800-831-9679*** to see how you qualify to get Ami Pro free while supplies last. You'll also receive a white paper detailing how and why other companies made the switch to Ami Pro 3.01. Yes, it's an incredible deal, but don't worry – once you try Ami Pro, we know you'll be back for more.

Lotus
Working Together™

*A maximum of 50 copies of Ami Pro will be provided to each participant. Copies provided to each agency, division, group, subsidiary or other affiliate of a participant will be aggregated for the purpose of this limitation. Supplies are limited. **Qualifications:** 1. The individual or entity wishing to participate in this program ('Participant') must currently own at least ten units of any stand-alone DOS or Windows word processor installed in the location where Ami Pro is to be installed. 2. The Participant must agree in writing to install all free copies of Ami Pro which it receives under this offer on Windows-ready PCs (386 or higher) within 30 days of receipt. This agreement must be signed by the individual owner or by an authorized representative of the entity that is the owner of the word processors. 3. The offer must be accepted between September 13, 1993 and October 31, 1993. 4. Units of Ami Pro provided under this program may not be applied toward volume purchase commitments, discounts, other promotions or credits. 5. Lotus Development Corporation, its advertising agency, software manufacturers, distributors, and resellers and their respective employees and agents are not eligible to participate in this program. In addition, individuals who already have Ami Pro, as well as entities and individuals eligible to purchase educational versions of Lotus products, are not eligible to participate in this program. 6. Decisions with respect to this program will be made by Lotus Development Corporation and those decisions are final and binding. 7. Other restrictions may apply. 8. This offer may be withdrawn at any time without notice. 9. To enter, call 1-800-831-9679 in Canada, call 1-800-GO-LOTUS.

*In Canada call **1-800-GO-LOTUS**. Employees of U.S. or state governments, government agencies call **1-800-831-9679 ext. 362**. © 1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, Working Together and Ami Pro are registered trademarks of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation. WordPerfect is a registered trademark of WordPerfect Corporation. Adobe Type Manager and the ATM logo are registered trademarks of Adobe Systems, Inc.



Help end the class struggle.

Here's your chance to train the next generation of knowledge workers before they show up for work.

Donate your unused computers, software, and peripherals directly to your local school.

Or contact Computers for Classrooms at one of the numbers below, and we'll direct your donations for you.

Either way, your generosity will pay off in gigabytes.



COMPUTERS FOR CLASSROOMS

Because instead of tossing your equipment out, or selling it for a few cents on the dollar, you'll be providing our classrooms with the most powerful teaching aid since teachers.

And getting a tax deduction in the bargain.

So donate the best—and most—equipment you can afford. When you do, you'll be helping a whole new class of people to succeed.

Gifts In Kind America
800-862-GIFT

The East-West Education Development Foundation
617-542-1234

The National Cristina Foundation
800-CRISTINA

Buddy-Up with Education
800-53-BUDDY

COMPUTERWORLD

Medical agency prescribes record cure

Incorporates OCR into data entry system to speed paper processing

By Ellis Booker

An ambulance races to the scene of a multivehicle collision on a back road in Florida. Minutes later, in the back of that vehicle, a paramedic makes some hasty notations about the patient's condition on a paper form.

Eventually, a copy of that report will arrive at the state's Department of Emergency Medical Services (EMS), which receives reports from 260 providers, representing more than 8,000 emergency medical personnel and paramedics.

But until recently this agency could easily analyze only a portion of these reports and the valuable data they contained.

"Before, we were only able to look at about 200,000 records per year — only the trauma runs," said Karen White, a health and services facilities consultant for the state of Florida. Earlier this year, White successfully field-tested a computer-aided data entry product called Paper Keyboard ICR from Datacap, inc. in Tarrytown, N.Y., that combines hand print, check box and optical character recognition (OCR).

Today, Florida's EMS agency can inspect more than 1.5 million records, and the redesigned paper forms contain 70 data elements — more than three times as much information as the old forms held.

According to users and analysts, while OCR and intelligent character recognition have made significant gains in just the past two years, the best approach is often a combination of technologies and, most important, a willingness to redesign long-cherished paper forms.

"Redesigning forms is certainly the easiest way out," said Kristy Holch, director of scanning market strategies at BIS Strategic Decisions in Norwell, Mass. "OCR is a very simple thing when it's in a controlled environment."

The trouble, according to Holch, is that the party interested in scanning the form (say, a manufacturer that wishes to scan a purchase form sent by a customer) may not have control over the paper form.

Controlled by others

The Illinois Department of Public Aid in Springfield is one place where the look of the OCR forms was largely dictated by other parties.

"Our forms comply with the data sets dictated by standards," said David Passoni, supervisor of forms control and forms design.

A Recognition International, Inc. customer since it began using production OCR forms in 1978, Passoni's department currently processes more than 12 million medical forms from medical providers across the state.

Because Illinois has been refining its Public Aid forms since 1978 — Passoni is now on his fourth generation of OCR scanner/readers — he suggested it is best to assume that the number of fields on a form will grow over time. The raw data requirements of users (in this case, the federal government) will not shrink but always grow.

"You want to leave as much room between data capture fields [on the form] as possible, to give you room to expand," Passoni said.

"What we sell is not recognition but data entry productivity; I think compa-



nies selling recognition are barking up the wrong tree," said Datacap President Mark Blau.

But Blau likewise noted the organizational obstacles to changing a form. "As soon as you get into forms redesign, it sort of opens a Pandora's box. Document forms are an organizational identity, and when you tinker with them, feathers get ruffled."

Florida's EMS agency, however, found the forms redesign a very valuable exercise. The system is used in conjunction with a PC document imaging system from Optika, linked to a VAX-based relational database from Data Access Corp. in Miami. The 486-class PCs runs over a Novell, Inc. local-area network.

One important design change was to put all handwriting on one side of the form and check-mark fields (also known as bubble marks) on the other.

The Florida project — the first intelligent character recognition project of its kind for an EMS agency — is set to be rolled out statewide next month. Volumes of more than 1.2 million forms are expected in the first year.

Keeps getting better

OCR has become far more dependable recently, thanks not only to better underlying algorithms for identifying single characters, but also because many OCR systems now use the context of the character (by word or even by looking at the entire document) in making determinations about each letter.

Another notable improvement has been in preprocessing the bit-mapped images — "cleaning up" smudges, enhancing faint or broken letters and properly orienting the page — before the OCR software kicks in.

It is surprising, however, that the OCR system for recognizing handwriting on pen-based computers is somewhat more accurate than its paper equivalents. This is because, unlike a static image of a character, extra information, including the order of the handstrokes and when the pen is picked up and put down, can be used to give hints about the identity of the character.

Sequoia awaits financier to back RISC-based line

By Craig Stedman
MARLBORO, MASS

Sequoia Systems, inc. has returned to profitability after flirting with a Chapter 11 bankruptcy filing in late 1992. But the fault-tolerant computer vendor's long-term product plans remain unsettled while it tries to find another company willing to help fund a delayed next-generation system.

Neil McMullan, Sequoia's president and chief executive officer, said in a recent interview that the company does not expect to ship a reduced instruction set computing (RISC) implementation of its product line until late 1995.

Originally, Sequoia was looking to have systems based on minority investor Hewlett-Packard Co.'s Precision Architecture-RISC architecture ready by the end of this year. "But our goal was to be a $100 million company as well as profitable and rich," McMullan noted.

Instead, Sequoia dropped to just $41 million in revenue for its fiscal year ended June 30, down from almost $63 million the year before. The company had to cut its spending sharply as a result, and the PA-RISC project was put on hold earlier this year, McMullan said.

Talks with HP aimed at getting more assistance in developing a PA-RISC machine have not been successful thus far. McMullan said the discussions are continuing but added that it is "certainly possible" that the PA-RISC project might be dropped altogether.

Sequoia is now talking with other vendors, including resellers Samsung Electronics and Toshiba Corp., about joint development deals involving other RISC architectures in case the PA-RISC concept is jettisoned, McMullan said.

HP continues to resell Sequoia machines based on Motorola, Inc.'s 68040 microprocessors, an HP spokesman said. He added, though, that there are "many options out there" in addition to Sequoia for providing a fault-tolerant PA-RISC system, if HP decides one is necessary.



Wooing users back

Neil McMullan, Sequoia's president and chief executive officer, conceded that it will be a while before the company can regain the trust of users made nervous by its financial problems.

"They had to be worried that we might go away at some point," he said. "It will take a long time for every customer to relax, and in the process, we will have lost opportunities — no doubt about that."

McMullan said he expects new 68040-based models, due out shortly, to keep Sequoia competitive, even though much larger rivals Tandem Computers, Inc. and Stratus Computer, Inc. have both switched almost exclusively to RISC platforms.

Unconcerned about delay

Fred Murray, director of information services at Hughes Supply, Inc., a Sequoia customer in Orlando, Fla., agreed, adding he does not need a RISC system in the near term. "Obviously, we'd like to see that come out, but if it's late 1995 or early 1996, that would be OK for us," Murray said.

Tony Mineo, director of data processing for the city of Lakewood, Colo., said he is also unconcerned about the lack of a RISC offering. That is "more a product they need to get into for marketing" purposes outside the installed base of Sequoia users, he said.

However, analysts said Sequoia's ability to attract new customers and start growing its revenue again would be uncertain without a RISC product line. "If they can't deliver until [late 1995], it's going to be a problem for them," said Stephen Josselyn, an analyst at International Data Corp. in Framingham, Mass.

"They're doing pretty well [financially], but there are still a lot of questions that have to be answered, and the biggest one is the HP relationship," added Casey Stern, an analyst at Starr Securities, Inc. in New York.

Sequoia reported net income of $750,000 on revenue of $10.5 million for its fourth fiscal quarter. The company expects profits each quarter this fiscal year and is looking for "modest" revenue growth in the 5% to 10% range, said McMullan, who took over at Sequoia in late 1992.

To help on the revenue front, Sequoia is trying to expand its ties and work more closely with resellers and software developers, he noted. The company has also set up a new unit that will attempt to license its fault-tolerant technology to other vendors.

HP 3000

CONTINUED FROM PAGE 71

HP users on both sides concur that for transaction processing, the 3000 with its MPE/IX is already a better performer than the HP 9000 with Unix, which was not built as a transaction processing specialist.

For that reason, the 3000, albeit a more expensive machine, is in less need of hardware upgrades. Because the 3000, in addition to its operating system, was designed for transaction processing, it is a more solid performer — but a more closed one — than a souped-up 9000.

Still, users and developers in the 3000 camp took heart that HP is continuing to evolve the venerable line.

Out of print

Above all else, HP is known as a solid engineering company that builds products that work. But one item has apparently been a dog: the Focus 500 page/min. laser printer. The company said, however, it has corrected the problems that were causing printer lock-ups.

"It's good news," said Steve Williams, owner of Datastructure, a San Francisco-based HP consultant and database tools vendor. "A couple of years ago we were very concerned that machine would be sunsetted."

And if the 3000 introductions follow the form of June's 9000 flurry, then HP will also cut prices on existing 3000 models.

Smart cuts

Rodger Lindquist, manager of business systems development at Laboratories, Inc. in Hercules, Calif., said it would make sense for HP to introduce bigger and cheaper 3000s because Unix in general is a threat to HP's MPE business, which the company reports is growing at a 5% clip compared with about 40% growth on the Unix side.

Lindquist said Unix vendors such as Sequent Computer Systems, Inc., which sets its prices below HP Unix tags, are taking accounts from traditional 3000 MPE shops.

"Sequent and other vendors come in with multiprocessing Unix boxes that have maybe four or eight 486 processors, and they're competing with HP's uniprocessor machines," Lindquist said.

One item on 3000 users' wish lists is a graphical user interface.

"One thing HP hasn't really done with the 3000 is improve the screen interface," Williams observed. "It's still the old mainframe style. If they came out with a graphical user interface, that would be great."

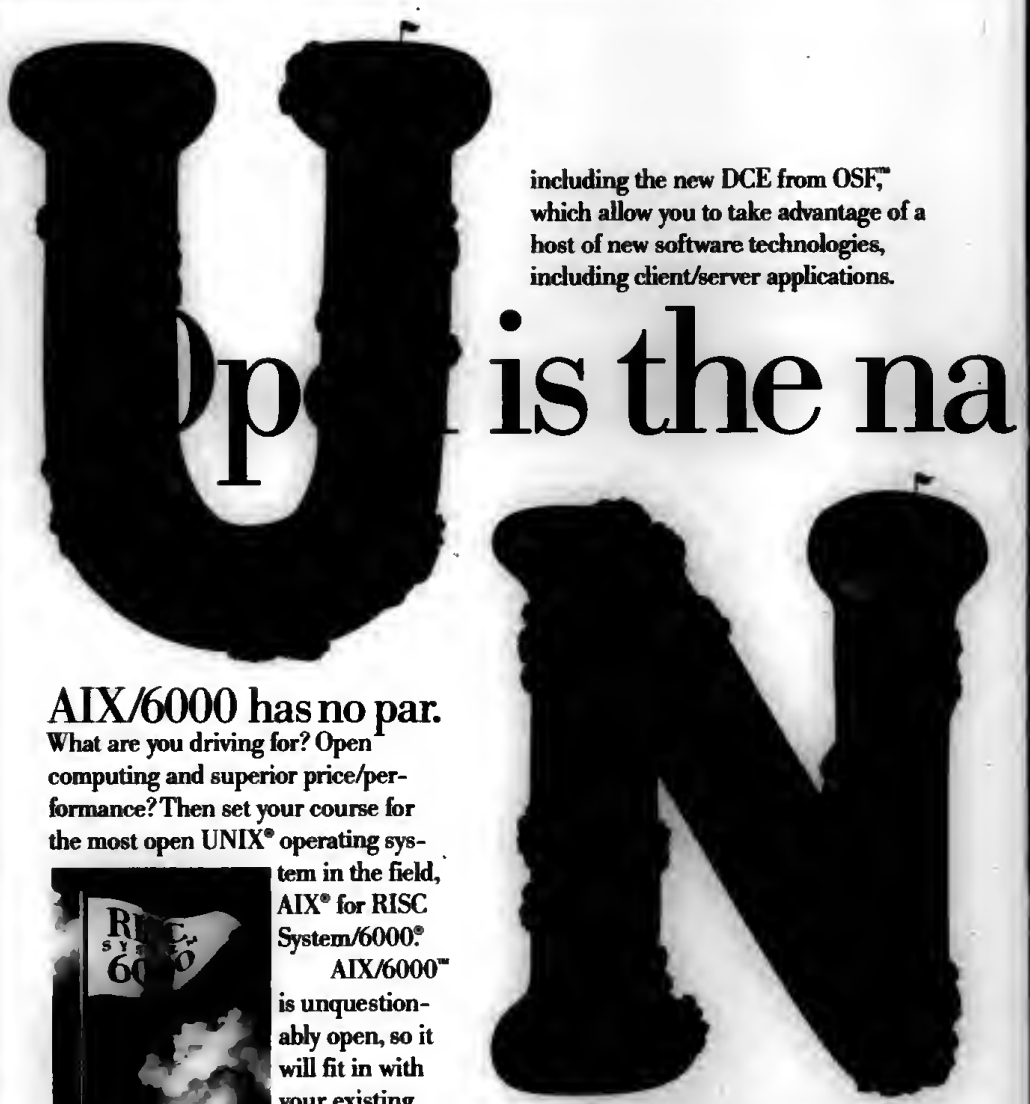
One item on HP 3000 users wish lists is a graphical user interface. The current interface is still in the old mainframe style

Meanwhile, on the 9000 side, users at Interex will be watching for new development and systems management tools from third parties and from HP. Compared with the 3000 market, pickings are slim, users noted.

"One of the things we're looking for is tools, tools, tools," said Jerry Kopecky, manager of MIS operations at IVI Travel, Inc. in Northbrook, Ill.

IVI Travel runs both 9000 and 3000 systems, and Kopecky pointed out that "if I can use common tools that integrate both environments, that would make my life easier." He also said that fewer tools on the 9000 side translate into higher training costs, "which can eat up the savings on cheaper Unix hardware and software."

The 9000 systems management tools he will be looking for will include functions such as job scheduling, security control and librarian and version control.



SAVE MONEY RECRUITING STAFF

Advertise in Computerworld's regional Careers pages. They work.

800-343-6474 x201

BMC Software, Inc. has announced updated versions of three direct-access storage device (DASD) data compression tools that emulate and fully exploit the hardware-based compression to be provided in IBM's Enterprise System/9000 Models 9021 and 9121 mainframes.

According to the Sugar Land, Texas, company, its hardware compression technique, included in Version 2.2 of Data Packer/IMS, Data Packer/OS and Data Packer/VSAM, delivers up to 70% compression without the Escon cabling or software and hardware upgrades hardware compression usually requires.

All three products share in the ability to extend the life of hardware by postponing or eliminating the expense of upgrading DASD.

Version 2.2 of Data Packer/IMS, Data Packer/OS and Data Packer/VSAM is priced by CPU level starting at $16,000, $11,500 and $9,500, respectively, for a perpetual license.

▶ *BMC Software*
(713) 240-8800

Quadrant Software has introduced FastFax/Blue, an IBM Application System/400-based fax server for PCs and fixed-function terminals connected to the AS/400.

The product can be used as a front end to IBM's fax enabler software, Facsimile Support/400, according to the Mansfield, Mass., company.

FastFax/Blue can be used for creating, sending, receiving and controlling fax activity. The product is seamlessly integrated with FastFax/WindowFax, the company's Windows-based driver. FastFax/WindowFax enables Windows users to transmit faxes directly from their PC application through a pop-up window.

Also introduced was FastFax/View, another product that works with FastFax/Blue and enables users to view inbound faxes on an attached PC.

Prices range from $2,495 to $15,495.

▶ *Quadrant Software*
(508) 337-8559

Wall Data, Inc. has introduced Rumba for NetWare Systems 3.2, which adds IBM Application System/400 connectivity to the product's existing mainframe access capabilities.

According to the Redmond, Wash., company, Rumba for NetWare Systems 3.2 is the only Windows workstation connectivity product for both IBM mainframes and AS/400 systems that operates simultaneously in Novell, Inc. NetWare for SAA, NetWare for SNA Gateway (now Microdyne Exos) and Transmission Control Protocol/Internet Protocol environments.

Rumba for NetWare Systems 3.2 can be licensed for one, 10, 25 or 64 workstations per local-area network.

License fees start at $395.

▶ *Wall Data*
(206) 883-4777

Pennant Systems has introduced four printers that can be attached to local-area networks, midrange systems such as IBM's Application System/400 and large systems such as IBM's Enterprise System/9000.

The Norwalk, Conn., company said the printers can increase productivity for users who require high-volume, high-speed printing (up to 150,000 impressions per month) and high-quality output.

The products can produce letter-quality business correspondence and presentations, including graphics, text and images, and can handle jobs such as heavy-duty dot-matrix printing. The introductions range from a 600 char./sec. ASCII dot-matrix printer to a 30 impression/min. electrophotographic printer.

Pricing begins at $2,595.

▶ *Pennant Systems*
(203) 849-6844

Product shorts

XPoint Corp. has introduced Forms-Xpress 3.2, electronic forms and bar-coding software. Features include spool data mapping and scalable fonts. Cost: Starts at $4,000. XPoint, Norcross, Ga. (404) 446-2764. . . . **XL/Datacomp** has announced a free 60-day trial of Storage Analyzer, an IBM Application System/400-based program that provides a detailed analysis of data residing on direct-access storage devices. Cost: The offer expires Jan. 1, 1994. XL/Datacomp, Hinsdale, Ill. (708) 323-1200.





Information *of the* Third Kind

The Document Management Seminar

• Texas Instruments used document management technology to save $4.5 million and improve its position in the marketplace by effectively responding to customers.

• British Telecom, a global telecommunications enterprise, cut costs by 80% and saved $750,000 on every engineering documentation release.

• Lockheed improved overall productivity in some complex areas up to 20-fold, and registered time savings of 25-50%.

Now you can attend a free half-day Executive Seminar that will show you how your organization can benefit from the most advanced document management solutions, and how you can leverage your own business-critical information.

You'll learn how to streamline the document management process and merge it into your mainstream information systems. You'll get demonstrations of innovative and proven software tools, and answers to questions about SGML, SGML-compliant software and ISO 9000 certification.

And you will receive a free copy of **The Document Management Guide**, newly updated and expanded, with answers to 50 of the most often asked questions about document management.

Call 1.800.456.5323, ext. 3
to register, or for more information.
Or use the reply card on the right.

Interleaf

Free Seminar

Reservation Form

___ Yes, please reserve my place, and contact me with more information about your free half-day seminar on document management -- Information *of the* Third Kind.

Seminars will be held twice in each city on the same date, 9:00 - 11:30 a.m. and 1:30 - 4:00 p.m.

___Washington D.C./Oct. 5
___9:00 a.m ___1:30 p.m.

___Seattle/Oct. 6
___9:00 a.m. ___1:30 p.m.

___New York City/Oct. 7
___9:00 a.m. ___1:30 p.m.

___Ft. Lauderdale/ Oct. 7
___9:00 a.m. ___1:30 p.m.

___Boston/Oct. 13
___9:00 a.m ___1:30 p.m.

___Los Angeles/Oct. 14
___9:00 a.m. ___1:30 p.m.

___Dallas/Oct. 19
___9:00 a.m. ___1:30 p.m.

___San Francisco/Oct. 21
___9:00 a.m. ___1:30 p.m.

___Chicago/Nov. 4
___9:00 a.m. ___1:30 p.m.

___Toronto/Nov. 17
___9:00 a.m. ___1:30 p.m.

Name_____

Title _____

Organization_____

Address_____

City_____

State/Province_____ Zip_____

M/S_____ Phone_____
(essential for confirmation)

Fax_____

Additional registrant(s)_____

_____

Or call 1.800.456.5323, ext. 3

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO.9 NEW BEDFORD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

INTERLEAF INC
PO BOX 61098
NEW BEDFORD MA 02746-9961

Every Seminar Attendee Will Also Receive A *Free* Document Management Guide

Newly updated and expanded! It includes the 50 most often asked questions about document management, and the answers.

"How do I start?"
This free Executive Guide will give you an overview of what you need to know about document management.

"How do I know if I have a document management problem?"

"I've already invested in a lot of hardware and software. What do I do with that investment?'

"What problems does document management solve?"

Call 1.800.456.5323, ext.3
Hurry, enrollment is limited.

Interleaf

Information *of the* Third Kind

You've gained cantral of your transaction-based infarmation through databases. And you've gained control af your office autamatian-based information thraugh personal productivity taals. But there's a third type of informatian in your organizatian. And it's the most impartant. If left unmanaged, it could mean the difference between yaur success and failure.

We call this -- Informatian af the Third Kind.™ It's the information that supports those business-critical processes necessary to achieving competitive advantage in the 1990's.

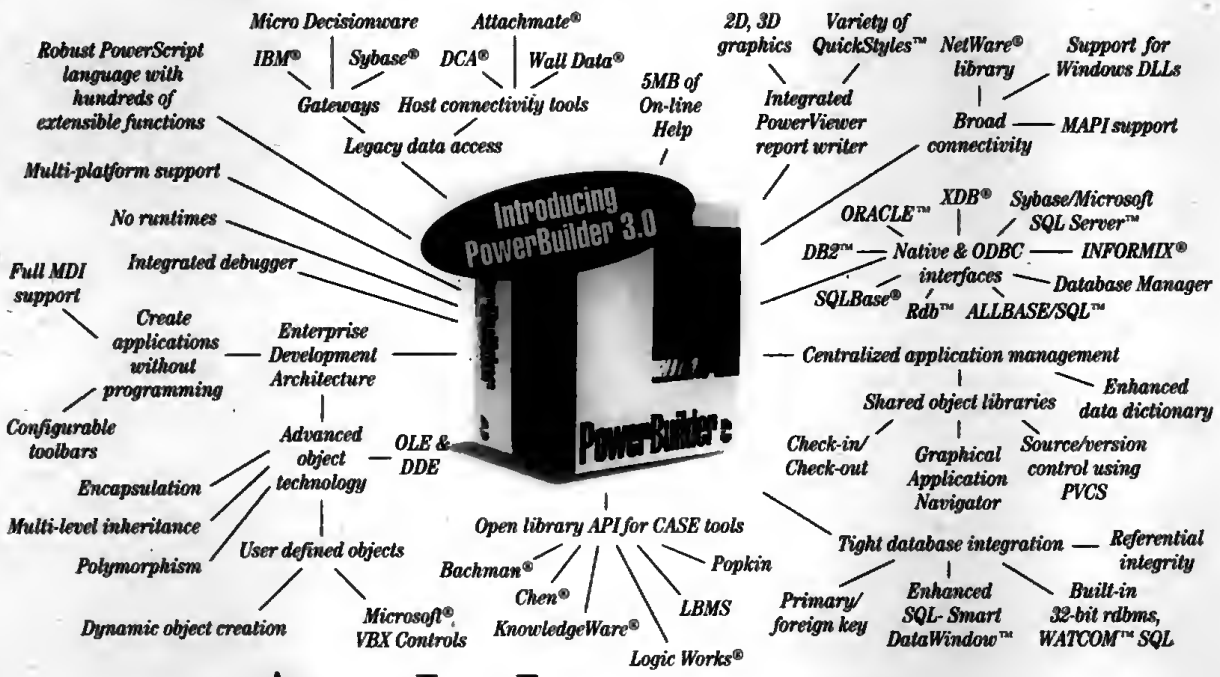
Interleaf Document Management Software is the enabling technology that can help you achieve this competitive advantage by assembling, controlling and disseminating Informatian of the Third Kind -- in user-friendly document form -- despite its growing complexity. Interleaf provides open solutions acrass all major platforms and in support of industry standards. To find out mare, call 1.800.456.5323, extension 3.

Interleaf. We turn information into advantage.

Interleaf

DOCUMENT MANAGEMENT SOFTWARE

Everything you asked for.



And then some.

PowerBuilder™ is the tool of choice for IS development teams who want results, not excuses. It has always provided the maximum in power and ease of use in multi-database client/server application development. Without compromise.

And with the introduction of PowerBuilder 3.0, now it's even better. More powerful. More graphical. More open. A glance above will give you some idea of what we're talking about.

And there's more. PowerBuilder's success has spawned a whole new suite of products that span the enterprise from IS to end users. Called the Powersoft Enterprise Series, it gives you best-of-breed tools that share Powersoft's Common Object Technology — thus enabling enterprise-wide collaborative development. This represents the first and only true Enterprise Development Architecture, letting IS use object technology to empower end users, for an "object-empowered" enterprise.

PowerBuilder drives the model, letting IS create and manage the use of powerful shared objects — forms, queries, reports and graphs. Then, using these shared objects, PowerViewer™ lets end users quickly create the business reports and graphs they need. PowerMaker™ delivers full PowerViewer functionality *plus* its own, built-in, WATCOM SQL database and the tools to develop robust form-based personal client/server applications — *without programming.*

PowerBuilder, PowerViewer, PowerMaker. Each one, the best in it's class. Together, in a class by themselves. The Powersoft Enterprise Series.



Special Introductory Prices

GET THE WHOLE ENTERPRISE STORY NOW! CALL 1-800-395-3525!

Powersoft

POWERSOFT ENTERPRISE SERIES

A new kind of power for a new kind of computing.

Powersoft Corporation, 70 Blanchard Road, Burlington, MA 01803 Powersoft Europe, Thames House, 1 Bell Street, Maidenhead, Berkshire, SL6 1BU United Kingdom
Now on GSA schedule with Government Micro Resources, GSA: GS00K-93-AGS-6351 All trademarks and registered trademarks are property of their respective owners.

Portable code develops

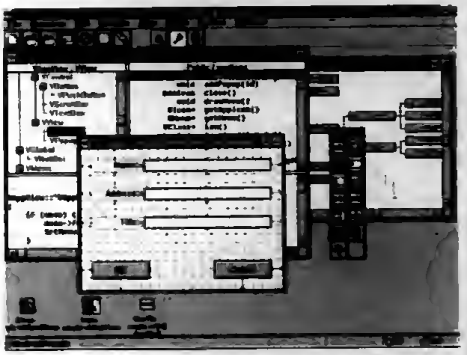
Liant tool enables crossover among PC, Mac, other systems

By Melinda-Carol Ballou

Liant Software Corp. recently announced C++/Views 3.0, a tool that will allow users to develop code that is portable across various environments.

The environments include Windows, the Macintosh, IBM's Presentation Manager and the Open Software Foundation's Motif, company officials said.

New with this version is C++/Views Constructor, a visual development tool that generates portable resources such as dialog boxes.



Liant's *C++/Views Constructor lets developers work visually with the Views class library to create the applications*

No code rewriting

The resources are called from an application at runtime. The same resource file can then be called from a Windows, Motif, Presentation Manager, Macintosh or DOS application and can offer a look-and-feel that is consistent with the targeted host environment, officials said. This makes it easier for developers to create applications for multiple graphical user interface (GUI) platforms without rewriting code.

"We take the Windows bitmap format and write code for the other systems that will read that [information] into your program and do the porting for you," said Joe DeSantis, vice president of research and development at Liant.

C++/Views Constructor lets developers work visually with the Views class library to create the applications. Users can cut and paste across multiple C++ applications using the tool. An enhanced Browser lets users draw and archive their resources and edit code that calls those resources.

C++/Views offers a class library that is similar to but extends Microsoft Corp.'s Microsoft Foundation Classes and Borland International, Inc.'s Object Windows Library (OWL). While the Microsoft and Borland class libraries primarily target Windows development and presuppose a thorough knowledge of Windows, Liant provides the cross-platform flexibility required by most corporate users.

"Even though Windows may be their most important platform, it's a No. 1 concern not to be locked in," DeSantis said.

Tim Albright, a senior consultant at Ameri-

Portable, *page 90*

When smaller really is better

Using CASE instead of Cobol brings savings

By Thomas Hoffman

The cost savings and productivity gains many user companies experience when downsizing from centralized information systems to distributed architectures are well-documented. But many of these shops do not realize some of the biggest downsizing benefits until they transform their application development approaches.

One vendor that has carved a niche for itself in this market is FourGen Software, Inc., a 10-year-old Seattle-based developer.

FourGen has developed "mainframe-replacement" financial and distributed applications with Unix, fourth-generation language (4GL), SQL and computer-aided software engineering (CASE) software.

Savings over Cobol

Several FourGen users have made substantial time and development cost savings by developing applications using FourGen's CASE tool sets instead of Cobol.

Take, for example, Paging Network, Inc. or PageNet. The $221 million Plano, Texas-based paging services provider has grown at an impressive 35% to 50% clip in each of the past 10 years. But the company's centralized information systems operations and customized financial software applications have held the company back from further expansion.

PageNet, with 60 offices across the U.S., had until recently run its operations on a network of 11 Datapoint Corp. minicomputers that ran customized Cobol financial applications. When the company decided to replace the minis with a suite of 100 Motorola, Inc. reduced instruction set computing servers 18 months ago, a faster, more flexible development environment was required, according to Craig Franklin, PageNet's director of IS and planning.

90 days

PageNet decided on FourGen's Enterprise general ledger, accounts payable and CASE software products. The applications, which use Informix, Inc.'s Online relational database management engine and 4GL, were used to customize eight general ledger and 45 accounts payable applications within 90 days.

Franklin said PageNet paid approximately $500,000 for the Four-

FourGen, *page 86*

Introducing

The greatest advance in COBOL programming since the Post-It™ note!

COBOL Source Analyst (CSA) is a new, fully interactive productivity tool that allows you to quickly analyze complex COBOL source code directly from SPF/PC! With CSA you can follow your logic paths on the screen, without using Post-It notes, paperclips or all 10 fingers! And, all within SPF/PC!

CSA is an optional extension of SPF/PC v. 3.0 that provides powerful new capabilities, such as:

- Navigation– allows rapid examination of the branching logic of a program;
- Outlining– provides hierarchical views of the program structure that can be expanded, collapsed and printed;
- Analysis– displays verbs and logic paths to see how a program is organized;
- Syntax Checking– highlights common syntax errors – before compiling!

CSA supports COBOL II®, OS/VS®, Micro Focus®, CA-Realia®, ANSI-74 and ANSI-85.

And, for a limited time, you can get CSA for just $149, saving you over 60% off the list of $395!

Call 800-336-3320 and order today!

CTC® 1040 Marina Village Parkway Alameda, CA 94501-1041

COBOL Source Analyst is a trademark and SPF/PC and the CTC logo are registered trademarks of Command Technology Corporation. All other products mentioned are the property of their respective owners.

Totally new from Command Technology Corporation, makers of SPF/PC.

FOR THE MOMENT?



OR FOR KEEPS.



While Our Competitors Huff, Puff And Blow Smoke, IPL Offers Service For Keeps.

No pigs in a poke here. You should know IPL customers are backed by service second to none.

IPL's ServiceONE is a direct, toll-free hotline to IPL technicians. 24 hours a day. 7 days a week. 365 days a year. With instant answers to any questions. Plus access to over 160 service offices and 700 technicians nationwide, as well as an immense network of locally-stocked spare parts. It adds up to one of the largest AS/400 service organizations on the continent. For maximum uptime. Minimum hassle.

IPL ServiceONE even protects your future investment before day one. Our system engineers develop and design the most efficient storage configuration based on your needs. All on site. Before you buy.

Technology Built For Keeps.

STAR ipl STORAGE AUTHORIZED RESELLERS

When you choose IPL, you're also running with the latest technology in the industry. Our Evolving Storage Platform (ESP) delivers technologically superior storage systems, with everything built in but obsolescence. We offer RAID or mirroring. 100% AS/400 compatibility with full IBM 9336 or 9337 DASD emulation. More features than you can imagine, in field-upgradeable units.

Look out. The wolves are at the door, selling storage built for the moment. So don't get suckered in. Call your IPL Representative or Storage Authorized Reseller (STAR) for custom-tailored service and storage solutions that will blow you away.

ipl FOR KEEPS.
SYSTEMS

1-800-338-8475



IPL Evolving Storage Platforms (ESP) deliver powerful, affordable storage. Backed by personalized service. All day. All night. For keeps.

Other product names are registered trademarks of their respective companies. © 1993 IPL

FourGen

CONTINUED FROM PAGE 83

Gen Enterprise general ledger and accounts payable applications and $18,000 for the CASE tools, including consulting services.

Had PageNet built those applications in-house using its Cobol, C and ISAM development environment, it would have taken at least a year and more than $1 million in development costs to complete the project, Franklin said.

"We wanted to buy applications along with an environment that was more productive than what we had with Cobol," Franklin said. "Since using the CASE tools, we've realized that we're two to three times more productive than we had been in our Cobol environment."

For example, PageNet recently developed a help desk tracking system to support its 2,500 users across the U.S. Using the CASE tools, two developers created the system in six weeks.

Franklin said he had considered other developmeot environments, including those from Sybase, Inc. and Oracle Corp. But based on his past experiences with those veodors, and after soliciting input from other users, Franklin opted for FourGen based on price and after-sales support.

"If we went with one of the other bigger names like Oracle, we felt like we would have been lost in the shuffle. FourGen has been heavily involved in many of our projects," Franklin said.

Easy and cheap

FourGen's CASE tools have also proved to be a cost-effective and user-friendly development environment at the National Easter Seal Society based in Chicago. National Easter Seal, which provides support to more than 1 million people with disabilities each year, has a $35 million budget this year. That translates into a slender $125,000 IS budget for 1993, which has placed great demands on the cost-effectiveness of the department's technology projects.

In the past, the National Easter Seal Society Budget Database was a potpourri of independent spreadsheet applications that required weeks of data entry and programming to synthesize data into a cohesive structure. To better streamline the system, the agency brought in FourGen's CASE tool set in February 1992, according to James Sanders, manager of IS at the not-for-profit group.

Within a week of using the CASE tools, two National Easter Seal programmers were able to bring up 12 screens for the budget database. Within a few weeks, the agency had developed 25 screens for its 60 dumb terminal users to access budget information over its Altos Computer Systems Multidrop network.

In addition, the CASE software provided National Easter Seal with simple user interfaces, a plus for an organization with few computer-literate staff members. "CASE provides a standard, simple user interface that makes it very easy for people to enter their data and get their reports," Sanders said.

Announcing COMPUTERWORLD on CD



Here's What You Get When You Subscribe:

- Over four years worth of full text articles from COMPUTERWORLD.
- Selected graphics from each issue showing industry trends, product comparisons and more.
- Articles from COMPUTERWORLD's annual *Premier 100* and *Computer Careers* magazines.
- Detailed information from *Premier 100* – data about IS budgets, profit growth, total scores and company highlights about all the Premier 100 companies.
- Over five years worth of articles from the *Journal of Information Systems Education*, published by DPMA's Special Interest Group on Education (EDSIG).
- Annual subscription includes four discs updated quarterly.

COMPUTERWORLD on CD Helps You:

- Search comprehensive product and vendor information quickly.
- Follow critical technology trends.
- Analyze top company IS profiles.
- Execute key word searches on any topic in seconds.
- Eliminate mass paper storage.

Easy-To-Use

Our powerful search and retrieval capability will deliver exactly what you are looking for in a matter of seconds . . . its simple . . . all you need to do is type in either a word or phrase related to your questions.

Plus, COMPUTERWORLD on CD features multi-platform compatibility on PC (DOS and OS/2), Windows, and Multimedia Player environments. And, coming in October 1993, COMPUTERWORLD on CD will also run in a Mac environment.

Two Ways To Become A Charter Subscriber and SAVE $

1. SAVE $100

Subscribe today and become a charter subscriber for just $295. You save $100 off the regular annual subscription rate of $395.

2. Order a Sony Multimedia CD Player and Get a FREE Charter Subscription

Sony Corporation has just announced a special offer only for COMPUTERWORLD subscribers.

Now Sony's spectacular, new, portable, PDX-100 Multimedia CD Player is available at the specially packaged price of just $995. This is no ordinary CD-ROM player. The Sony PDX 100 combines audio with text, graphics, and animation. It plays multimedia CD-ROM software and features CD music playback capability.

PLUS, with your Sony Multimedia CD-ROM player, you'll get a 1 year subscription to COMPUTERWORLD on CD absolutely FREE.

Don't miss this opportunity to have quick access to the most powerful news source on information systems. Order today by completing and returning the form below. For faster service call. (800) 285-3821. (Outside the U.S. call (508) 879-0006).

Save $100

What users like about Computerworld on CD:

"It can look up products and company names...indispensable."

"...finds product information and client information quickly."

"...full base text, good graphical start for each article."

"Can search across multiple issues and find the thing I'm looking for. Makes life easier."

"The sheer volume of what's in it. Easy access without having to go to a library service."

"It has information not found on Computer Select."

Source: Survey of Computerworld on CD subscribers, May 1993.

COMPUTERWORLD on CD

Yes! Please reserve my Charter Subscription to COMPUTERWORLD on CD and send me my first quarterly disk.

- ❑ Please enter my subscription to COMPUTERWORLD on CD. I'll pay just $295*, a savings of $100 off the regular annual rate
- ❑ Please send me my Sony Multimedia CD-ROM Player. Enclosed is my check for $995*

And, with this purchase I'll also receive a FREE subscription to COMPUTERWORLD on CD

FIRST NAME LAST NAME

TITLE COMPANY

ADDRESS

CITY STATE ZIP

*U.S. Only. To complete your order, mail this form to: Emerging Technology Applications, ATTN: Sales Department, 111 Speen Street, Framingham, MA 01701. For Credit Card orders call: (800) 285-3821. Checks should be made payable to: Emerging Technology Applications.

CD/9-13

Briefs

CASE for Windows

Microsoft Corp. and Inference Corp. announced a joint agreement that will allow Microsoft to use Inference's computer-aided software engineering-based retrieval technology and engineering services in future versions of Windows. The Inference object-oriented technology will provide the intelligent user assistance component of Windows, according to Microsoft officials. Separately, IBM and Vantive Corp. are also using the Inference retrieval technology for their on-line Help products.

Oracle 7 support

Blyth Software, Inc. in Foster City, Calif., is now shipping support for Oracle Corp.'s Oracle 7 for Blyth's Omnis development tools. Omnis provides client/server connectivity between Macintosh and Windows environments.

Yes! I want to learn more about how ObjectView® can put me on the fast track to rapid client/server application development. Please send me:

| | Free demo diskette and product literature for ObjectView

| | Information on upcoming ObjectView seminars

Name: _____ Title: _____

Firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: ( ) _____ FAX: ( ) _____

Mail or FAX this card to **1-404-365-0246**.
For even faster delivery, call **1-800-338-4130**.

CW-0913

KnowledgeWare
3340 Peachtree Road, NE
Atlanta, Georgia 30326

No Postage
Necessary
If Mailed
In The
United States

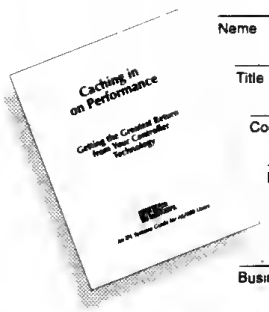
BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO 15528 ATLANTA GA

POSTAGE WILL BE PAID BY ADDRESSEE

ObjectView® Information
KnowledgeWare Inc.
3340 Peachtree Road, NE
Atlanta, Georgia 30326-9826

IPL's Free Booklet Helps You Cache In On Performance.

Your controller is the key. So let IPL help you understand its role in DASD performance–with insight and advice on controller design, implementation, cache features and performance goals. For your free booklet, return this card or call 1-800-338-8475.



Name

Title

Company

Business Address

City State Zip

Business Telephone Ext

AS/400 System Type No. of Systems

ipl FOR KEEPS. SYSTEMS CW 9/13 © 1993 IPL

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 04591 NATICK, MA

POSTAGE WILL BE PAID BY ADDRESSEE

Attn: Corporate Communications
IPL Systems, Inc.
60 Hickory Drive
Waltham, MA 02154-9546

☒ Need it NOW!

Client/Server CASE & Methods

☒ See it NOW!

Free Client/Server Seminar Series

☒ Get it NOW!

Free 'HyperGuide to GUI Design' Diskette

☒ Do it NOW!

Free 30-day Trial

Fax it NOW: (713) 623-4955

Phone it NOW: (800) 231-7515

NOW who are you?

Seminar Locations:

Atlanta
Boston
Chicago
Cincinnati
Stamford
Dallas
Denver
Detroit
Houston
L.A./Orange County
Los Angeles
Memphis
Miami
Minneapolis
New York City
Philadelphia
Pittsburgh
Portland
San Antonio
San Francisco
Seattle
St. Louis
Tampa
Toronto
Washington, D.C.

Name

Company

Address

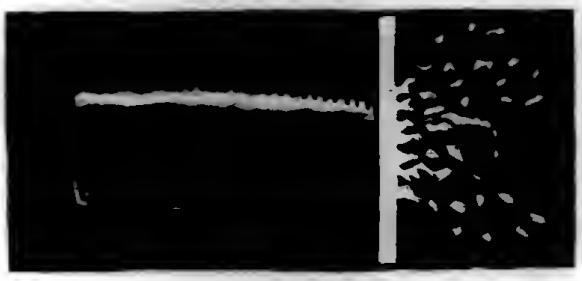
City/State/Zip Code

Phone/Fax

LBMS

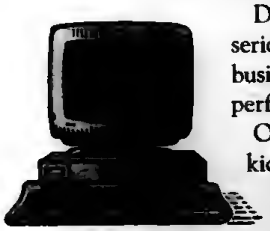
INTRODUCING W THEY WORK FASTE BREAKS, AND ACTU

INTRODUCING DELL OPTIPLEX. PCs DESIGNED FOR BUSINESS-CRITICAL APPLICATIONS.



DESIGNED AND CONFIGURED TO WORK HARDER AND FASTER.

This is much more than just another new line of PCs. These are role models for everyone in your office.



Good-looking, hard-working, dedicated, flexible. See back page for resume and financial requirements.

Dell's new OptiPlex™ PCs are serious, hard-working, hard-core business machines, designed to perform in the workplace.

Our accelerated local bus video kicks all your standard workday applications into high gear. Our systems are up to 16% faster than our major competitors' PCs.† As anyone who's ever worked on a spreadsheet will tell you, that adds up fast. (And spreadsheet workers are great adders.)

Every OptiPlex system also features advanced Dell® optimized Windows™ display drivers. We also give you the ever popular burst mode memory transfer and block mode IDE transfer. (Translation: things go faster.)



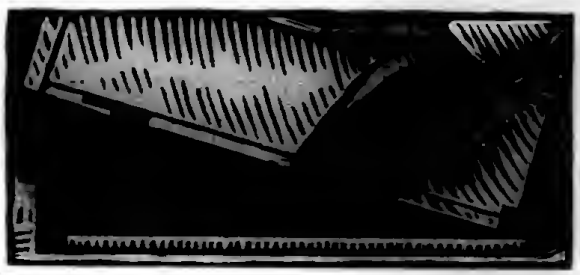
We give you up to 16% faster overall application performance than our leading competitors!

And to spare you the usual set-up hassles, we'll have your PCs ready to run, right out of the box. You can have your choice of six network interface cards factory-installed. We'll also be quite happy to install your choice from over 100 of the most popular business software applications. All you pay is a flat $15 installation fee.



Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete 8/10/93. Independent performance measurements by NSTL running BAPCo SYSmark92 on comparable ISA systems configured substantially identical ears. The Intel Inside logo is a registered trademark and Pentium and Overdrive are trademarks of Intel Corporation. FORTUNE 500 is a registered

ORKAHOLIC PCs. R, TAKE SHORTER ALLY PLAN AHEAD.





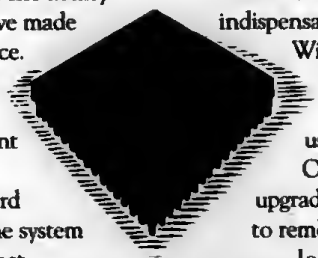
EASIER TO MAINTAIN, SO YOU GET BACK TO WORK FASTER.

Nothing's more important in business than the ability to quickly bounce back from adversity. So we've made our OptiPlex PCs extraordinarily easy to service. Our unique OptiFrame™ chassis can essentially be snapped apart after turning a couple of thumbscrews. Most of the important component assemblies can then be removed simply by loosening one screw per assembly. And the card cage lifts out in one piece for easy access to the system board. No cards to remove or cables to disconnect.

In fact, you'll find that our whole company is easy to use. Dell offers a unique service plan – our SelectCare™ program. You can pick and choose from a comprehensive menu of service options that includes everything from an optional 5-year parts and labor warranty to a highly economical plan for those who would prefer to maintain their PCs themselves. The bottom line is, you pay only for services you want or need. And not a cent for those you don't.

It's this kind of service and support that has made Dell the winner of virtually every major customer satisfaction survey in the past five years. It's also earned us a place in over two-thirds of the companies in the FORTUNE 500.*

And having picked up over $2 billion in worldwide sales, we think we'll keep it up for a little while longer.



If you want them to work even harder, no problem. All systems are upgradeable to Pentium Overdrive.



With our embedded diagnostics you don't have to push hard to get at the root of a problem.

READY TO GROW AS YOUR BUSINESS GROWS.

There's one more thing we built into these PCs that is indispensable to any successful business. Foresight.

With an OptiPlex L system you can easily upgrade from three to five slots, and from three to five drive bays. The chassis upgrade usually takes but a few painless minutes.

OptiPlex systems also feature an easy BIOS upgrade – by way of flash RAM so there are no chips to remove. With the system's embedded diagnostics located in the BIOS as well, that too is an easy upgrade. What's more, you can add up to 128KB of cache for memory-intensive applications. All systems can also be upgraded to Intel's mighty Pentium™ Overdrive™ processor.

We suggest that you call us soon. With hard-working business machines like all of these out there, if you don't bring them on board soon, you can be quite sure your competitors will.



We offer guaranteed five-minute response to calls, 24 hours a day.† See, someone does work longer hours than you.

DELL

TO ORDER, CALL

800-225-4907

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA, CALL 800-668-3021 IN MEXICO CITY, 228-7811 #11489

copy, please call our TechFax™ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees. Windows is a trademark of Microsoft Corporation. †Benchmarking performed by National Software Testing Labs on the Dell OptiPlex, each with equivalent or maximum allowable external cache. NSTL is not affiliated with Dell and makes no recommendation or endorsement of any products. BAPCo-prepared tests executed by NSTL in accordance with Dell parameters. Results from other tests may trademark of The Time Inc. Magazine Company. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

Developer segments language offerings

By Michael Vizard
CARY, N.C.

Hockware, Inc., a developer of a visual implementation of the Rexx programming language used in IBM mainframe and OS/2 environments, is in the process of delineating its product line into low-end and high-end offerings.

At the low end, Hockware plans to offer a Bronze Edition of its VisPro/Rexx programming environment, a $99 offering that supports OS/2's Presentation Manager interface, the Workplace Shell Utility and the Common User Access user interface standard.

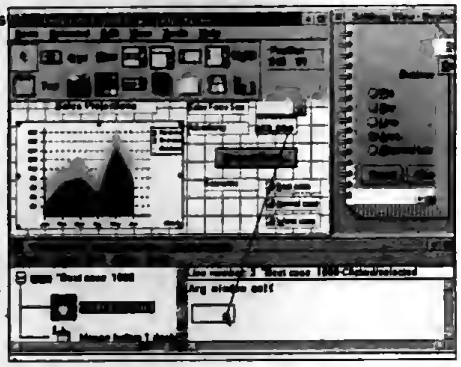
Hockware plans a $300 Gold Edition at the end of the year that will provide more support for IBM's System Object Model and can create entity-relationship diagrams in applications that use IBM's DB2/2 database.

Company President David Hock said VisPro/Rexx is intended to provide the same interactive development environment found in C++ language tools in a visual programming environment.

Patrice Saint-Louis, a systems analyst at The Chase Manhattan Bank NA in Miami, uses VisPro/Rexx for building prior statement applications on top of OS/2.

Prior to adopting OS/2 systems, Chase ran its print statement applications on an IBM Application System/400. However, with the availability of Rexx on OS/2, Chase moved those applications to the less expensive OS/2 platform.

"With VisPro, it's a lot easier to add features to those statements now," Saint-Louis said. She also noted that competing tools, such as Visual Rexx from Watcom in Waterloo, Ontario, do not allow developers to distribute free runtime applications. VisPro/Rexx requires 2M bytes of hard disk space.



Hockware's VisPro/Rexx is intended to provide the same interactive development environment found in C++ tools

Now you see it with Magic RAD tool

By Melinda-Carol Ballou

Magic Software Enterprises, Inc. is now shipping Version 5.5 of Magic, the company's Rapid Application Development tool for client/server and host environments. The new release offers improved concurrent multiuser development, embedded SQL, two-phase commit and increased support for relational database management systems.

Magic allows developers to write DOS, Unix, CTOS and VMS applications visually, based on the function of an application. They do not have to write code. Arithmetic or logical expressions can also be done in shorthand, and variable names can be represented by either numbered or lettered lines in a table, analysts said.

With this release, Magic officials are beginning to actively target the lucrative client/server tools market and vendors such as Powersoft Corp. and Gupta Corp. Once the company ships full versions for Microsoft Corp.'s Windows and Windows NT during the first half of next year, however, it will be in a better position to target the Windows development arena.

Multiple developers

The concurrent development features of the release enable Magic to act as an application administrator, coordinating development activities so anyone working on a project is informed about code changes. Multiple developers can check in and check out work at any time.

Gary Rappaport is president of Napco International, a $34 million Minneapolis-based distributor of military parts and a subsidiary of holding company Venturian Corp. He spoke about the time savings involved with the group development support of Magic 5.5.

Napco downsized from an IBM mainframe last year using Magic. The company had a 3.5G-byte database that tracked international trading of parts; it downsized to a Tricord Systems, Inc. PC superserver and a Novell, Inc. local-area network of PCs.

Rappaport's developers started out using Gupta's development tools but switched to Magic after they saw colleagues at another company making a comparable transition more quickly.

Despite the greater programming speed with Magic, team development was cumbersome with the earlier version, he said. Previously, changes made by individual programmers had to be imported separately from the centralized Magic program file. With the new release, developers will be able to work at their own pace and integrate changes "on the fly," he said.

"For a four-person team working together, this is a substantial productivity enhancement, which will probably save three to four hours of work per day for one programmer," he said.

It took his team about a year to move the 150 files from the database and to rebuild from scratch a set of old Cobol programs created during the previous 20 years, Rappaport said.

Time to shift to group development

Davy Bent, manager of field services at Dunkin Donuts, Inc. in Randolph, Mass., said his group is still performing single-user, DOS-based development on 486-based PCs using Magic. But the group programming features will be useful when he gets faster machines and shifts to group development. The two-phase commit and database support interested Bent, who has an Oracle Corp. RDBMS in-house.

The SQL support available with Magic 5.5 includes implicit (built-in) SQL, explicit SQL and SQL Assistor capabilities.

Magic manages all SQL development with its "implicit" SQL feature, so developers do not have to write SQL code and can focus instead on application functionality, officials said.

With the "explicit" SQL support, developers who choose to work directly with SQL can embed SQL statements, which are database-independent, directly into Magic programs. The SQL Statement Assistor minimizes the effort required to write embedded SQL commands by supporting SQL RDBMSs from Oracle and Sybase, Inc. as well as Digital Equipment Corp.'s Rdb.

Magic 5.5 is priced at $2,000.

Portable code

CONTINUED FROM PAGE 83

can Airlines in Fort Worth, Texas, agreed.

"One of the big things for us with Liant is its multiple platform support," he said. "While gigantic corporations like Microsoft and Borland do incredible work, what makes me uncomfortable is [being wedded to] those environments. With Views, you can concentrate on paradigms and less on the specific GUIs."

According to Albright, Liant handled the lower-level Windows calls and abstracted them so his group did not have to go through a steep learning curve for Windows.

"Views is separated from the GUI and presents another layer that you can write to," he said.

Albright added that being able to own the source code — as his group is able to do with Liant — was also key for American Airlines.



International Data Corp. analyst Steve McClure said the Liant product handles another problem for developers: geometry management. When geometric constraints are specified in one environment, they will be sized and placed appropriately for the target GUI using C++/Views, he said.

C++/Views for Windows will ship this month; the OS/2, Motif, Macintosh and DOS versions are slated to be available in the fourth quarter. Pricing ranges from $499 for the DOS character version to $1,999 for Unix/Motif.

Microsoft shows groupware templates

By Michael Vizard
REDMOND, WASH.

Microsoft Corp. has put one more piece of its long-term groupware strategy into place. The company used a recent satellite broadcast to showcase 13 modifiable templates to 15,000 developers (see chart).

Created with the help of eight third-party vendors, the $39 templates are intended to provide corporate developers with models for building workgroup applications using Microsoft PC applications and databases.

"The templates take you about 50% to 70% of the way there. They still need to be customized for individual applications," said Hugh Chang, a Microsoft product manager.

Analysts view the templates, which cover a range of applications, as a good deal that few corporate information systems shops will be able to pass up.

"Basically Microsoft is giving these away. A lot of applications span different tools, and it's a major challenge to educate programmers on what these tools can do," said Mike Heylin, an analyst at Creative Strategies International, Inc. in San Francisco. Heylin said the templates would be useful to corporate developers with mainframe backgrounds because they might not be familiar with PC development tools.

Template	Vendor	Location
Budget consolidation, expense report	Micro Modeling Associates, Inc.	New York
Status reporting	Parlan Development, Inc.	Chicago
Remote query	Voice Data Management International, Inc.	New York
Expertise planner	Connect Computer Co.	Eden Prairie, Minn.
Meeting coordinator	Canaan Analytics	Wilmington, Del.
Report consolidation	KPMG Peat Marwick	Washington, D.C.
Help desk travel reservations	MIDAK International, Inc.	Tucson, Ariz.
Customer tracking	Third Wave Technologies	Overland Park, Kan.

SYSTEMS DESIGNED TO MAKE YOUR BUSINESS WORK HARDER. NOT YOUR BUDGET.

INTRODUCING DELL OPTIPLEX. PCs DESIGNED FOR BUSINESS-CRITICAL APPLICATIONS.







FEATURES COMMON TO ALL OPTIPLEX SYSTEMS

- i486™ PROCESSOR UPGRADEABLE TO PENTIUM™ OVERDRIVE™
- UNIQUE OPTIFRAME™ CHASSIS - EASY SERVICE AND MAINTENANCE
- UPGRADEABLE OPTIFRAME L CHASSIS HAS 3 16-BIT ISA SLOTS AND 3 STORAGE BAYS (EASILY FIELD UPGRADEABLE TO THE OPTIFRAME MX CHASSIS)
- MIDSIZE OPTIFRAME MX CHASSIS HAS 5 16-BIT ISA SLOTS AND 5 STORAGE BAYS
- ACCELERATED LOCAL BUS VIDEO WITH DELL OPTIMIZED WINDOWS DRIVERS
- 512KB VIDEO RAM EXPANDABLE TO 1MB
- OPTIONAL VESA® LOCAL BUS SLOT(S)
- OPTIONAL 128KB CACHE
- 4MB RAM EXPANDABLE TO 64MB
- BURST MODE MEMORY TRANSFER
- BLOCK MODE IDE DISK TRANSFER
- FLASH RAM BIOS
- EMBEDDED DIAGNOSTICS
- ONE DISKETTE DRIVE (3.5" OR 5.25")
- QUIETKEY™ 101 KEYBOARD
- MS-DOS® 6.0/MICROSOFT® WINDOWS™ 3.1/MOUSE
- GUARANTEED* NEXT-BUSINESS-DAY ON-SITE SERVICE^
- GUARANTEED* 5-MIN. RESPONSE TIME SUPPORT - 24 HOURS/DAY

DELL OPTIPLEX 425s/L

$1,499 | BUSINESS LEASE^ $55/MO.

- i486 SX 25MHz
- OPTIFRAME L CHASSIS
- 120MB IDE HARD DRIVE
- SVGA 1024I MONITOR (14", 1024 x 768, .28mm)

DELL OPTIPLEX 433s/L

$1,799 | BUSINESS LEASE $67/MO.

- i486 SX 33MHz
- OPTIFRAME L CHASSIS
- 170MB IDE HARD DRIVE
- ULTRASCAN™ 14C MONITOR (14", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 433/L

$1,999 | BUSINESS LEASE $74/MO.

- i486 DX 33MHz
- OPTIFRAME L CHASSIS
- 170MB IDE HARD DRIVE
- ULTRASCAN 14C MONITOR (14", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 433/L

$2,249 | BUSINESS LEASE $83/MO.

- i486 DX 33MHz
- OPTIFRAME L CHASSIS
- 230MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 450/L

$2,449 | BUSINESS LEASE $91/MO.

- i486 DX2 50MHz
- OPTIFRAME L CHASSIS
- 230MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 466/L

$2,999 | BUSINESS LEASE $111/MO.

- i486 DX2 66MHz
- OPTIFRAME L CHASSIS
- UPGRADED TO 8MB RAM
- 340MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 433/MX

$2,749 | BUSINESS LEASE $102/MO.

- i486 DX 33MHz
- OPTIFRAME MX CHASSIS
- UPGRADED TO 8MB RAM
- 340MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 466/MX

$3,249 | BUSINESS LEASE $120/MO.

- i486 DX2 66MHz
- OPTIFRAME MX CHASSIS
- UPGRADED TO 8MB RAM
- 450MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

intel inside

ALSO AVAILABLE: **DELL 466/ME**

$3,649 | BUSINESS LEASE $131/MO.

(NOT PICTURED ABOVE)

- i486 DX2 66MHz
- 4 EISA AND 2 ISA EXPANSION SLOTS AVAILABLE
- 5 STORAGE BAYS
- BURST MODE MEMORY TRANSFER
- BLOCK MODE IDE TRANSFER
- FLASH RAM BIOS
- 8MB RAM EXPANDABLE TO 64MB
- 450MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ACCELERATED LOCAL BUS VIDEO WITH DELL OPTIMIZED WINDOWS DRIVERS
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE (3.5" OR 5.25")
- QUIETKEY 101 KEYBOARD
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE
- EMBEDDED DIAGNOSTICS
- GUARANTEED NEXT-BUSINESS-DAY ON-SITE SERVICE
- GUARANTEED 5-MIN. RESPONSE TIME SUPPORT - 24 HOURS/DAY

**Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax℠ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees. ^Prices valid in the U.S. only. Some products and promotions not available in Canada or Mexico. ^Leasing arranged by Leasing Group, Inc. For business use only. Prices based on 36-month, open-end lease, 10% purchase option. ^On-site service provided by BancTec Service Corporation. On-site service may not be available in certain remote locations. MS-DOS and Microsoft are registered trademarks and Windows is a trademark of Microsoft Corporation. The Intel Inside logo is a registered trademark and i486, Pentium and Overdrive are trademarks of Intel Corporation. VESA is a registered trademark of Video Electronics Standards Association. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.*

DELL

TO ORDER, CALL

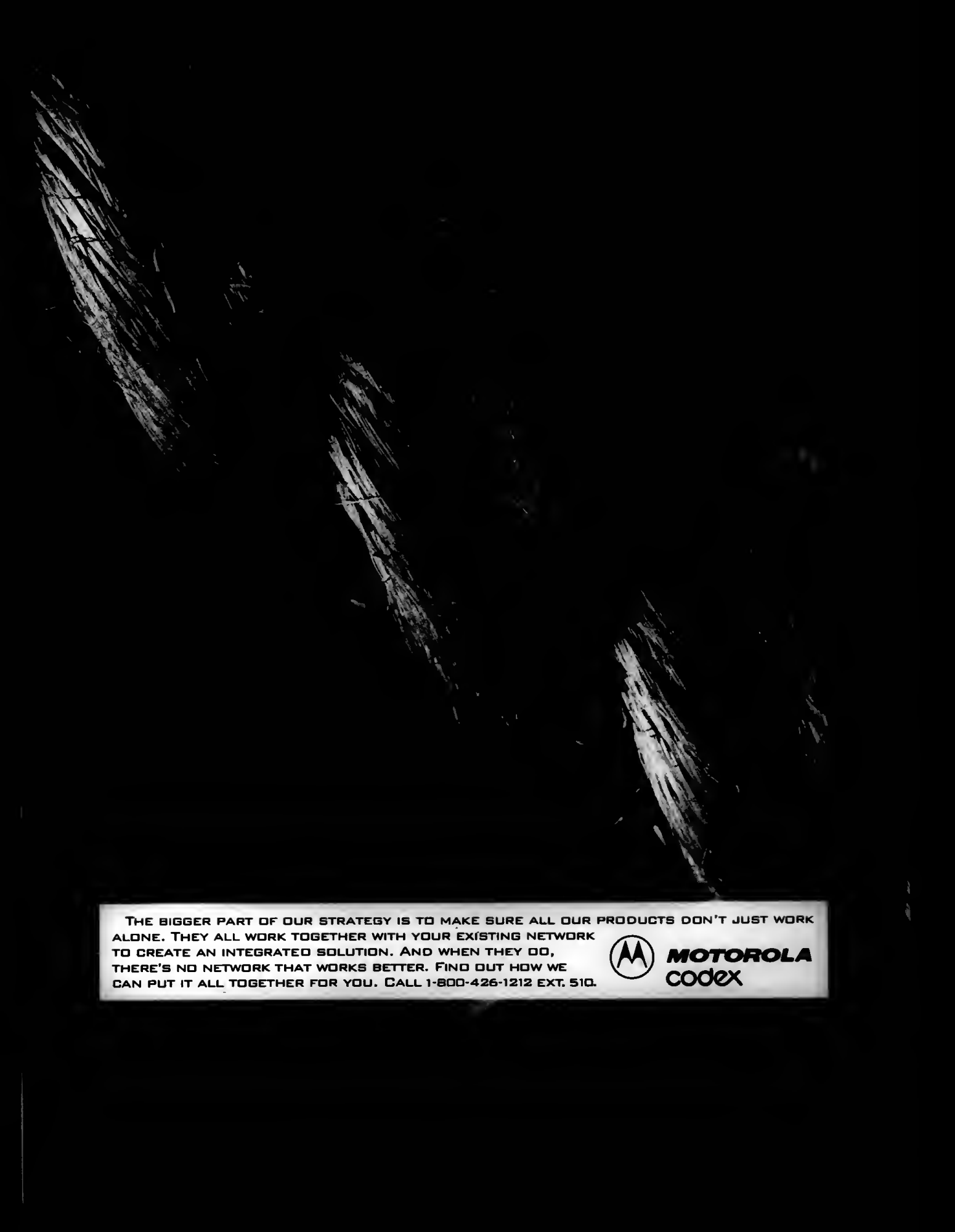
800-759-6644

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT

IN CANADA? CALL 800-668-3021 IN MEXICO CITY? 228-7811 #DINF1



Corporate brand names are the properties of the listed companies © 1993 Motorola Inc. Motorola, Ⓜ, Codex are trademarks of Motorola Inc



THE BIGGER PART OF OUR STRATEGY IS TO MAKE SURE ALL OUR PRODUCTS DON'T JUST WORK ALONE. THEY ALL WORK TOGETHER WITH YOUR EXISTING NETWORK TO CREATE AN INTEGRATED SOLUTION. AND WHEN THEY DO, THERE'S NO NETWORK THAT WORKS BETTER. FIND OUT HOW WE CAN PUT IT ALL TOGETHER FOR YOU. CALL 1-800-426-1212 EXT. 510.

MOTOROLA
codex

Beth Gardner

A fruitful investment



There are lots of reasons why software re-engineering is worth the investment of time and effort. Modifying application code in this way decreases complexity, increases quality and better enables future business enhancements.

Re-engineering also simplifies the maintenance of programs and increases the productivity of the programmer. It allows developers to extract specific program parts that will be shared and reused across an enterprise and ported to other platforms or application environments such as client/server environments.

Those are the whys, but what about the hows?

One, two, three

Actually, there are several distinct processes that fall under the general category of re-engineering changes. The first is code restructuring. Restructuring code simplifies complex programs, improves performance and reduces the incidence of errors when changes and enhancements are made.

The introduction of a certain number of errors is inevitable whenever program changes are made. The incidence of errors is two to three times greater, however, when programmers try to enhance unstructured code. In addition, it has been estimated that a programmer can maintain three times as many lines of structured code as unstructured code.

Program modularization is another important aspect of software re-engineering. Once a large application has been restructured, additional gains can be realized by dividing it into smaller units. Modularization is crucial when you want to create reusable, sharable program units to make new development more efficient or improve the maintainability of existing applications.

Think how many date-time routines that an IS shop uses. There may be as few as the number of individual applications or as many as the number of developers at work when the applications were developed. Now think how much easier it would be to handle the century date rollover problem if you could slice the redundant routines from each program and create one reusable subroutine.

Modularization is also invaluable for moving applications off the mainframe and into a client/server environment. Program slicing can split out functions that will run in the new environment.

Language migration also plays a large part in re-engineering. Old Cobol programs are poorly structured, require high investments in maintenance and don't allow programmers to take advantage of new development tools and platforms. OS/VS Cobol applications can't exploit new hardware capabilities and generally compile and execute more slowly than the same application migrated to the latest level of compiler.

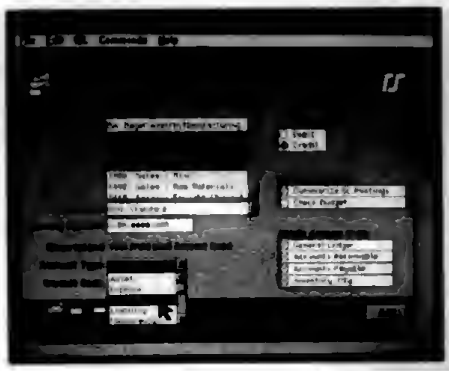
Still another aspect of software re-engineering — and one that can yield significant payback in terms of maintenance productivity gains — is data name rationalization and standardization.

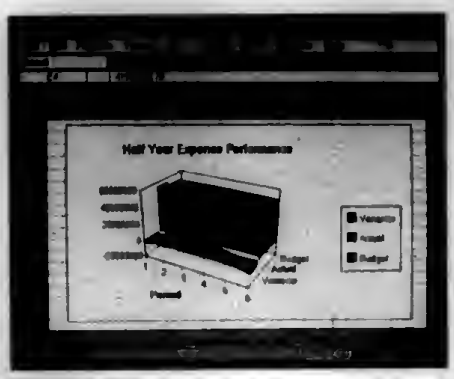
This process involves identifying all the various definitions of a particular data element across the application, reconciling all these elements and then updating all occurrences of the element in all the source modules, files, database definitions and screens. The goal is to define something like a part number once, store the common definition in a repository and key all new development and legacy system changes off this definition.

Data standardization, like most software re-engineering activities, requires a substantial investment of time and effort. But the yield is substantial: Maintenance programmer productivity can improve by as much as 30%. Where else can you get that kind of return these days?

Gardner is a senior redevelopment strategist at IBM.

Introducing R
The First Client/S
That Re







Built on a relational database. Architected for client/server.

Designed for open systems.

Downsize without losing functionality.

Sound like wishful thinking being discussed around the water cooler?

Think again. It's Renaissance CS™, Ross Systems' unique approach to client/server.

Renaissance CS is client/server the way client/server should be.

The applications accommodate mixed environments. PC. Macintosh. Graphical or character cell. Makes no difference to Renaissance CS. The applications adapt to each screen format. So why wait until you

Must Software International has introduced Executive Nomad, a visual information access and analysis tool that delivers data to users at every level.

The product merges the Norwalk, Conn., firm's Nomad client/server fourth-generation language with Pilot Software, Inc.'s LightShip visual information tool.

Executive Nomad employs an object-oriented interface based on Windows. Data is exposed with image, chart and document objects.

Executive Nomad costs $25,000 for the mainframe server and five workstations. Each additional workstation costs between $595 and $1,295.

▶*Must Software International*
(203) 845-5000

XVT Software, Inc. has announced XVT-PowerObjects, custom controls that complement the Boulder, Colo., company's portable graphical user interface development solutions for C.

PowerObjects in this release include table objects; a tool bar; a status bar; a toggle/picture button object; and rows and columns of cells for storing text. The cells feature horizontal and vertical rules; horizontal and vertical scrolling; column headings; and setable line height, column width and margins.

An XVT-PowerObjects library costs $395 on PCs and $495 on workstations.

▶*XVT Software*
(303) 443-4223

Lucid, Inc. has introduced Energize 2.1, a C and C++ development environment.

Several features have been added to this version of Energize to provide users with greater performance and productivity gains, according to the Menlo Park, Calif., company.

These features include the ability to use precompiled headers, full support of C++ templates and syntax highlighting.

A five-pack of Energize 2.1 costs $16,250, or $3,250 per seat. For a workgroup of 10, the price is $29,500, or $2,950 per user.

▶*Lucid*
(415) 329-8400

Prodea Software Corp. has announced ProdeaSynergy, a graphical application integration tool for designing custom business applications.

ProdeaSynergy automates the flow of information among software products regardless of vendor, how the products communicate or where things are stored, according to the Minneapolis company.

ProdeaSynergy features support of current and future messaging standards and distributed computing that goes beyond the Windows desktop and across local- and wide-area networks to a number of choices.

ProdeaSynergy costs $495 per copy.

▶*Prodea Software*
(612) 942-1000

Product shorts

MingleWood Data Systems, Inc. has announced SQLVOX Version 1.1, a development and runtime environment for the integration of Interactive Voice Response applications with Oracle Corp.'s database. Features include a true client/server-based implementation, an integrated SQLForms-based development environment, comprehensive cursor support and caching capabilities. Cost: $2,500. MingleWood, Los Angeles, Calif. (213) 653-6510.... **UnderWare, Inc.** has announced Track Record, a Windows-based information tracking tool for PC software developers. The product tracks information including feature requests, test cycles, bug reports, testers, releases, schedules and documentation. Cost: An introductory price of $89 per user will change to $159 per user after Dec. 1. UnderWare, Boston, Mass. (617) 267-9743.

enaissance CS.
erver Applications
ally Are.



can afford to convert all desktops? Phase-in client/server now with Renaissance CS, add GUI desktops as you grow.

Another unique feature is Renaissance CS' split processing. It allows you to process information on the server or the client, depending on the business function. Process large volume transactions on the server. Integrate document data with spread sheets and graphics on the client. The point is, you decide. Not us.

If you'd like to know more about the first, easy-to-use, client/server software for mixed environments, and if you'd like to downsize without losing any functionality, call Ross Systems at 404-851-1872, ext. 2400.

ROSS SYSTEMS

COMPUTERWORLD
CAREERS ON-LINE
508 879-4700
with your computer/modem

Only One Software Covers Every Desktop Strategy

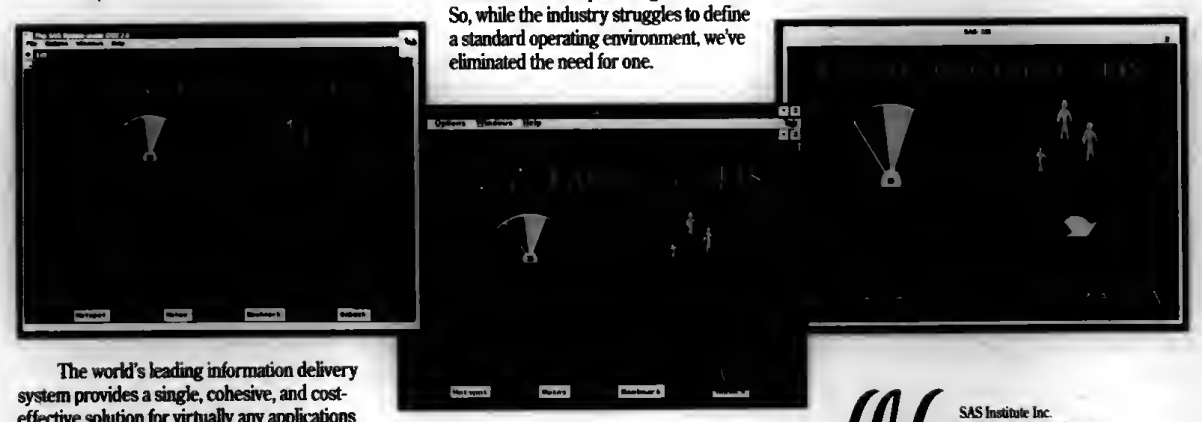
The SAS® System
The World's Leading Information Delivery System

Windows™? OS/2®? UNIX®?

The debate rages on over which desktop operating system is best. Fortunately, the question of which software to choose has been settled once and for all. All you need is the SAS System.

What's more, the SAS System is portable across all your hardware. Our exclusive MultiVendor Architecture™ lets you integrate different desktop platforms (who *says* you have to choose?) and share data and applications between the desktop and larger machines. So, while the industry struggles to define a standard operating environment, we've eliminated the need for one.

And cut out the expense of buying—and supporting—all those stand-alone desktop solutions. See for yourself in a free video. **Just give us a call at 919-677-8200.**



The world's leading information delivery system provides a single, cohesive, and cost-effective solution for virtually any applications request. From executive-level information systems to total quality management systems for the manufacturing floor. Customized interfaces make it easy for anyone—at any level—to gain immediate productivity.

Call Now for a Free Video Introduction

With the SAS System, you can rely on a single software system for Windows *and/or* OS/2 *and/or* UNIX *and/or* any other platform.

SAS Institute Inc.
Sales & Marketing Division
SAS Campus Drive ☐ Cary, NC 27513
Phone 919-677-8200 ☐ Fax 919-677-8123

SAS is a registered trademark and MultiVendor Architecture a trademark of SAS Institute Inc., Cary, NC, USA. Other brands and product names are registered trademarks or trademarks of their respective holders.
Copyright © 1992 by SAS Institute Inc. Printed in the USA.

the HEAT goes on

Continued high pressure from corporate downsizing and demanding business units molds some, crushes others

BY AMY BERMAR AND KATHLEEN ROTENBERG

SPECIAL REPORT
COMPUTERWORLD SEVENTH ANNUAL JOB SATISFACTION SURVEY 1993

The continuing crash course in corporate downsizing and re-engineering has left information systems pros both empowered and exhausted.

Computerworld's seventh annual Job Satisfaction Survey of 781 IS managers and professionals reveals that ongoing pressure is both squashing and molding people and careers. Some thrive; others don't survive.

Many IS professionals — despite staggering new work loads, continued stress and more demanding business units — insist they're satisfied with their career choice (see chart).

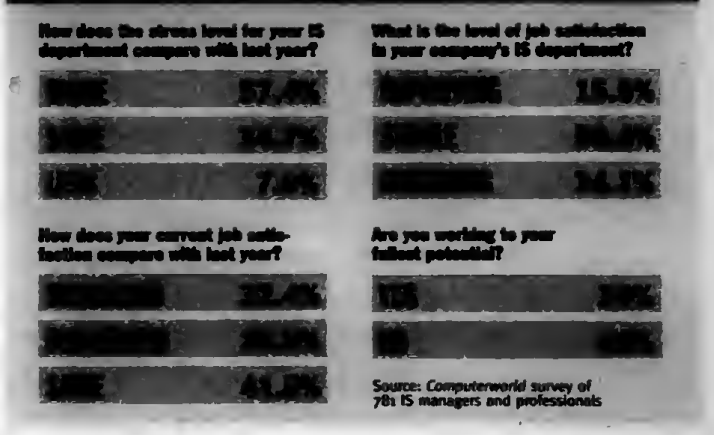
Even so, employees who had once planned on long-term careers continue to grapple with the consequences of layoffs, cutbacks and stalled upward mobility. Overall satisfaction, although still high, continues to erode, especially at lower levels.

Even more troubling is a continued increase in the number of respondents who believed they were performing below their potential.

Because numbers don't tell the whole story, we've profiled three survey respondents to tell the IS job satisfaction story: an IS executive, a staff analyst and a midlevel manager. ■

Bermar and Rotenberg at Corporate Ink write about the computer industry. They are based in Newton, Mass.

BEST OF TIMES, WORST OF TIMES





Maryfran Johnson
Editor, Client Server Journal

Mark Halper
Senior Correspondent

Jean Bozman
Senior West Coast Editor

RELENTLESS, DETERMINED, COM

Relentless in the pursuit of the latest breaking news in IS.

Determined to dig deeper and work harder to uncover the stories that matter most to you.

Committed to the highest standards of excellence and integrity in journalism.

Focused on bringing you the IS information you need to know, when you need to know it.

Driven to cover it all — PCs, workstations, mainframes, client/server computing, networking, communications, open systems, languages, and more.

These are the qualities that distinguish the editors, writers, designers, and production staff of *Computerworld*. And they are the reason *Computerworld* is the newspaper of IS.

Week in and week out, the people at *Computerworld* cover the world of IS in greater depth and breadth than any

Photos: Al Fisher, Tom Zimberoff, 1992



Joanie M. Wexler
Senior Editor Networking

Alan Alper
News Editor

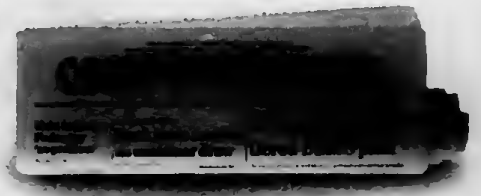
MITTED, FOCUSED, AND DRIVEN.

other publication. That's why over 138,000 IS professionals pay to subscribe to *Computerworld*. Shouldn't you?

Subscribe to *Computerworld* today and you'll receive 51 issues packed with everything you need to know to do your job better. And get an edge on the competition. Plus, you'll get our special bonus publication, *The Premier 100*, an annual profile of the leading companies using information systems technology.

Order today by calling us toll-free at **1-800-343-6474**. Or use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Then you'll see how a few relentless, determined, committed, focused, and driven people can make a difference.



The Newspaper of IS

Make your re-engineering team's wishes come true.



"IT'S AMAZING HOW MUCH MORE SOME PEOPLE CAN GET OUT OF A PC THAN OTHERS."

Announcing *Computerworld*'s 2nd Annual Re-engineering Team of the Year Award.

Have you successfully completed an ingenious re-engineering project? Don't keep the good news bottled up — enter the 1993 *Computerworld* Re-engineering Team of the Year competition.

Here's the rub

We're looking for re-engineering efforts that have:

- Radically redesigned business processes.
- Shown quantum-leap improvements over previous business processes.
- Made a significant contribution to improving the business' bottom line and competitive position.
- Displayed IS/end-user teamwork.

To enter, grant us three wishes

1. Submit by Oct. 8, 1993, an up-to-1,500-word description of the re-engineering effort. This statement should include the reasons for and scope of the project, a description of the business processes before and after they were re-engineered, how the re-engineering project supports the company's strategic goals, the role of the IS organization and how IS worked with users, how the project was accomplished, any benefits already achieved and anticipated benefits. Include documentation to support your claims.

2. All entries must be signed by the IS executive and one of the business unit executives who sponsored or led the re-engineering team.

3. Include the name, address, phone and fax number of the two entrants, along with two or more references who are familiar with the project and are willing to be interviewed. One reference should be a beneficiary of the project: a customer, supplier or user from the sponsoring business unit.

Fame will be yours

The winner will be announced and profiled in an upcoming issue of *Computerworld*. A special Re-engineering Team of the Year trophy will be presented in February at an awards ceremony attended by top IS executives.

Send your application to:

Re-engineering Team of the Year Award
Computerworld
375 Cochituate Road
Framingham, MA 01701
Fax: (508) 875-8931

For more information, contact:

Joseph Maglitta, senior editor/corporate strategies, or Allan E. Alter, senior editor/management, at (800) 343-6474.

Contest is open to all end-user organizations, consulting firms and system integrators. Companies selected for consideration will be contacted by a representative of CW Publishing, Inc. for further details and verification. The winner will be chosen by a panel of *Computerworld* editors.

COMPUTERWORLD
The Newspaper of IS

© Computerworld, an IDG company. Computerworld is a trademark of CW Publishing, Inc. Contest is void where prohibited by law. No purchase necessary.



ROB NELSON

Bowater, Inc.'s Dan Rogers says: 'There's always capability to improve'

Stress way of life for upper executives

As the de facto re-engineering "czar" charged with rolling out more than a half-dozen mission-critical applications this year, Dan Rogers cannot recall when work was more stressful. Or more satisfying.

Rogers, 49, was recruited six years ago for a once-in-a-lifetime opportunity: to redesign how Bowater, Inc., the country's largest maker of newsprint, uses information technology.

As director of information technology, Rogers routinely works 50-hour weeks. But the 31-year industry veteran says his staff is tiring of the intense pressure associated with rolling out eight strategic applications in a single year.

Even so, using the latest technologies has improved morale at the Greenville, S.C., firm, he says. One ongoing project employs client/server computing to migrate diverse systems to a single, integrated architecture based on distributed database technology.

Rogers concurs with the 57% of senior information systems executives who say performance is improving. He also agrees with the 61% of his colleagues who say employees are not working to their potential. "There's always capability to improve," he says.

Turnover has been low in the 135-person IS department, despite corporate cutbacks in response to two prolonged industry downturns. "Raises are becoming more of an issue," Rogers says, noting a dozen other ways in which satisfaction could be improved, including flexible job scheduling, bonuses, training, recognition and opportunities for advancement.

But he hardly expects to eliminate the stress. Launching new projects that promise to reshape how people work is "always a fight," Rogers says. He began six years ago by helping 2,000 employees understand how to, and why they should, use PCs.

Recently, he has focused on convincing employees that re-engineering their jobs is good for everyone. Still, the toughest battles may come next year, when his efforts touch IS departments that don't report directly to him.

"Until now," he says, "I've had control." ■

SENIOR MANAGERS

SATISFACTION: Highest of all groups. One-third reported being "very satisfied" with their work, though levels have dropped since last year. Reasons: Lack of corporate vision, heavier work loads, no management support. Positive factors included more freedom, more decision-making power and exposure to new challenges and projects.

STRESS: Slightly more than last year but less than others polled. More than half said they felt more stress in 1993. Culprits: Heavier work loads (78%) and growing demands from business units (46.7%). One-fifth are working more hours compared with last year.

Staffers not immune to reorg blues

With ITT Hartford Life Cos. facing a reorganization, it's sometimes difficult for staff consultant Bryan Lifsey to look on the bright side of things.

Yet he frequently does. Lifsey relishes the day-to-day contact with other information systems professionals in his immediate group of 150 in the Connecticut-based insurer's information management administration department and conveying requests for new IS projects to an IS steering committee.

IS PROFESSIONALS

SATISFACTION: Poor. Only 16% said they were "very satisfied" with their job — about half the percentage of top-level managers. Most frequently cited reasons: Poor management, layoffs, weak economy, few training opportunities.

STRESS: Down a bit but still edges out middle managers as the most stressed-out group. Some 58.6% experienced more pressure than in 1992, blaming staff cutbacks, concerns about job loss and anxiety about recession.

IS PERFORMANCE: Warning sign: Twice as gloomy as top bosses, almost half said IS satisfaction was declining. And only one quarter said IS performance was improving — half the number of top execs who said so.

BEST MOTIVATORS: Strongest believers that better pay and personal advancement opportunities are key.

MOBILITY: Less desire to change jobs than last year. But one in 10 said they are actively looking for a better post.

Lifsey is also privy to confidential data processing information about pending activities regarding finance and payroll. He says he appreciates the trust and recognition that implies.

Lifsey says he's had ample opportunity to learn new technical skills and believes he is working to his potential. That's relatively unusual: Sixty-six percent of his peers responded that they aren't.

But after 14 years at this company and 20 years in the industry, the uncertainty is taking a toll — Lifsey says he's somewhat less satisfied now than he was last year.

"Restructuring is almost as traumatic as layoffs," says Lifsey, who logs 45 hours weekly and thinks his co-workers are working longer and harder than ever.

"I think people are performing at their fullest potential," he says. "They're putting in more hours and working harder because of the job security issue."

Reorg blues, *page 102*

Reorg blues

CONTINUED FROM PAGE 101

Even so, some 80 people corporatewide have taken early retirement. Another 200 have opted for severance packages.

Morale boosters

More bonuses, salary increases, public recognition of accomplishments and improved opportunities for advancement could help his morale, Lifsey says, and would help his group perform more effectively.

Nearly one-third of the entire survey sample reported leadership problems as a primary source of job dissatisfaction. IS professionals, our survey found, were most likely to leave their current jobs for better career opportunities (63.9%), better pay (51%), less stress (33.2%) and, yes, superiors with better communication skills (26.1%).

But new opportunities may be hard to find after the forthcoming restructuring, which will eliminate many job titles.

How employees will respond is uncertain. Fully 29% of lower-level professionals say they consider a raise the most effective motivator and most influential factor in improving job satisfaction.

According to Lifsey, the company promises that salaries won't be cut. "The jury is still out," he says.

A similar restructuring already occurred at the executive level of the information management group. "They were just happy they had their job," Lifsey adds. ■



Rick Nelson

Middle execs learn skills, gain notice

After back-to-back budget cuts and layoffs that sliced almost one-third from the corporate staff at Steelcase, Inc.'s office furniture factory in Fletcher, N.C., systems manager Anne Smith was less than optimistic about her long-term career prospects.

"I felt pretty dead-ended," said Smith, 36, who has held this position for eight years.

Predictably, middle managers in IS — like many of their colleagues in other disciplines — were more fearful about job loss than IS professionals and top managers were.

Spending cuts crimped development plans. Yet having the opportunity to learn new skills is important to 63% of the midlevel managers surveyed, and according to Smith, her team is eager to move to client/server technology.

Although she says her 12-person staff is technically respected, senior management wonders whether the staff members are too young to handle sizable projects. Minimal raises and scarce opportunity for promotion have simply added to the increased pressures.

Then this past spring, morale began inching upward.

"Things began turning around," Smith says. The economy improved, making new layoffs less likely. Then a budgeting change shifted hardware purchases to end users, relieving Smith of having to reject requests for new systems. The factory also began working toward ISO 9000 certification.

Improving morale

Most noticeably, Smith's own contributions were publicly recognized when she was asked to join the vice president's strategy-setting team. This highly visible task force extends IS' reach to the entire plant and positions Smith's department as a key contributor in identifying and resolving critical business problems.

Her next step is to extend this satisfaction to her staff. Like most managers, Smith ranks job security, public recognition and enhanced work tools as factors that would help her group work more effectively. For now, she'll strive to keep her team going with frequent informal discussions, staff training and joint tackling of the ever-present backlog of applications.

Smith says members of her staff — all in their 30s — are unusually close. This has become an unexpected source of personal satisfaction.

"I think that's what's kept us hanging in there," she says. ■

MIDLEVEL MANAGERS

SATISFACTION: Widely down from last year and lower than that of top bosses. Only one-fourth said they felt "very satisfied." Most blamed poor leadership and fuzzy direction.

IS PERFORMANCE: Not as good as top bosses believe but this group is more optimistic than IS professionals.

BEST MOTIVATORS: Strongest believers that personal congratulations mean a lot. More money would help, too.

STRESS: Slightly better than last year. Even so, more middle managers (57%) experienced greater stress this year (though less than IS professionals).

MOBILITY: Surprisingly the most inert group. Only 6.9% were actively looking for a new job — half the number of higher and lower levels.

Despite widespread downsizing and cuts, Steelcase, Inc.'s Anne Smith says she feels optimistic

METHODOLOGY

For this survey, *Computerworld* polled 781 information systems managers and professionals selected from our subscriber list.

Surveying took place in June and was coordinated by IDG Research Services in Framingham, Mass.

SEX:
Males: 81.6%, Females: 18.4%.

AGES:
Under 25: 1%, 25-34: 21.5%, 35-44: 40.7%, 45-54: 29.7%, 55-64: 6.8%, 65 and older: 0.3%.

Introducing
PC DOS 6.1

We just did one better.

It's the new PC DOS 6.1 from IBM. And it one-ups MS-DOS® 6 for a lot of reasons.

For one, it's got improved memory management. The Memory Optimizer not only gives users more memory, but also a configuration watcher to run the system more efficiently.

It's got utilities you don't get with MS-DOS. For instance, you get a Program Scheduler for any program or DOS command, and a new editor that allows you to edit files at the same time.

It's got features you don't get with MS-DOS. Such as support for PCMCIA Card Services (i.e., hot plugability for portable users), and the industry's leading Pen support for DOS.

And there's one more reason that goes beyond the software—PC DOS 6.1 is backed by superior service and support, including a 24-hour helpline you can actually reach. What's more, the first 60 days of support are free.

So if you haven't got PC DOS 6.1, get it from your local software dealer. Or call **1 800 342-6672**.



Features and Functions	PC DOS 6.1	MS-DOS 6
Backup—Tape support;	x	
High-speed floppy disk support	x	
Approximate number of viruses that can be detected	>1,400	800
Automated system configuration optimizer	x	
PCMCIA II support	x	
Enhanced editor	x	
Program scheduler	x	

(In Canada, call 1 800 465-7999.)

When you consider all it's got, PC DOS 6.1 from IBM is definitely the one to get.

IBM®

IBM is a registered trademark of International Business Machines Corporation MS-DOS is a registered trademark of Microsoft Corporation ©1993 IBM Corp

Executive Track

New York-based **EMI Music Publishing** has promoted **John Murphy** from vice president of information technology to senior vice president of information technology. In this role, Murphy will have worldwide responsibility for information technology at the giant music publishing house. He said he intends to focus on upgrading core business systems worldwide and linking worldwide affiliates and performing rights societies to EMI.

The Chicago Board Options Exchange has promoted **Gerry O'Connell** to first vice president of its systems division. He was previously vice president of systems development. In his new role, O'Connell will oversee all information systems at the exchange and administer a $17 million IS budget. O'Connell replaces **Kruno Hultzingh.**

Capital Data Systems, Inc. in Raleigh, N.C., the information technology services subsidiary of Dover, Del.-based Chesapeake Utilities Corp., has appointed former Memorex Telex Corp. executive **Jim M. O'Reilly** as its president. Capital Data Systems' main business is providing information technology services to the telecommunications and utilities industries. O'Reilly was vice president of Memorex Telex's personal computing division. O'Reilly succeeds **H. Randolph Currin Jr.**, who will remain the company's chief technology officer.

Matthew S. Jacobs has been appointed executive vice president and director of information systems at **Fleet Mortgage Group, Inc.**, an originator and servicer of mortgage loans in Columbia, S.C. In this newly created position, Jacobs will be responsible for managing information systems throughout the group. Prior to this appointment, Jacobs was chief operating officer at Lomas Information Systems in Dallas and most recently was an IS consultant at Lomas Financial Corp., Computer Power, inc. and Federal Home Loan Mortgage Corp., focusing primarily on strategic planning.

Intelligence File

Liar, liar, IS on fire

Lying to management, as Robert L. Glass sees it, is a "conflagration that threatens to consume our information systems field." Glass detailed the extent of the epidemic in this month's issue of *The Software Practitioner*. The IS people who admitted to lying claimed it's the only way they can function, he said. They insisted they had to "check their ethics at the door."

The effect of these fabricators, Glass insisted, is directly linked to the credibility problems IS departments face.

Is there a solution to all this deception? Glass cited the self-redemption of one wayward soul who fled a job for which lying was the rule for one where the truth "works." "First there is the relief from just getting away. Then there's all the doubt, mistrust and searching for the 'catch.' Then . . . [you] reach the point of acceptance, and understanding replaces all the negatives."

Source: *The Software Practitioner*, Robert L. Glass, September 1993.

Book Review

Toyota Production System, Second Edition

By Yasuhiro Monden; Industrial Engineering & Management Press, Norcross, Ga.; $53.95

In 1983, a Japanese professor, Yasuhiro Monden, gave the English-speaking world its first in-depth look at Toyota's revolutionary manufacturing process in his Nikkei Prize-winning book, *Toyota Production System: An Integrated Approach to Just-In-Time*.

A second edition of the book has now been published that describes the changes that have occurred in Toyota's production system, including the introduction of computer-integrated manufacturing technology, expert systems and artificial intelligence to its just-in-time system.

For more information, call the institute's customer service center at (404) 449-0460.

THIS IS A QUESTIONNAIRE FOR THOSE

USE POWERH

PLEASE FILL IT OUT IF YOU S

FIND THE



1 Does your development tool provide everything you need to build complex applications, including: ☐ Full Microsoft Windows™ GUI support for your end-users. ☐ OLTP ☐ Batch Processing (If you checked all three boxes, you're already using PowerHouse.® You're not supposed to be doing this questionnaire.)



2 a. Does your development tool make it easy to build complex applications? ☐ Yes ☐ No

b. If you answered yes, does your development tool have built-in "application models" and predefined business constructs to eliminate the tedious and time-consuming coding process? (Hint: Only PowerHouse has them.) ☐ No ☐ No

3 Does your development software provide an integrated desktop environment for the industry's leading end-user tools, PowerPlay® and Impromptu,® which, we might add, are coincidentally also designed by Cognos®? ☐ Yes ☐ I wish

4 Does your development tool let you build applications that outlive their environment so you don't have to waste about a zillion hours you don't really have to begin with, rewriting applications every time some new operating system or database comes along? ☐ Yes ☐ No, once again

© 1993 Cognos Incorporated. Cognos, PowerHouse, PowerPlay and Impromptu are registered trademarks of Cognos Incorporated. All others are the property of their respective trademark holder. In Canada call 1-800-361-3163.

Calendar

SEPT. 26 - OCT. 2

Association of Banyan Users International Hosts Conference and Expo. Ottawa, Sept. 26-29 — Contact: Association of Banyan Users International, Chicago, Ill. (312) 644-6610.

OOPSLA '93: Conference on Object-Oriented Programming Systems Languages and Applications (OOPSLA). Washington, D.C., Sept. 26-Oct. 1 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

IS as a Service Organization. Columbus, Ohio, Sept. 27-28 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7373.

Imaging Expo. New York, Sept. 28-30 — Contact: Comtek International, Wilton, Conn. (203) 834-1122.

OCT. 3 - OCT. 9

The Ninth International Congress on Advances in Nonimpact Printing Technologies/Japan Hardcopy '93. Yokohama, Japan, Oct. 4-8 — Contact: The Society for Imaging Science and Technology, Springfield, Va. (703) 642-9090.

Networld '93. Dallas, Oct. 5-7 — Contact: Bruno Blenheim, Inc., Fort Lee, N.J. (201) 346-1400.

OCT. 10 - OCT. 16

Design/West. Anaheim, Calif., Oct. 10-12 — Contact: Karl Steidl, Reed Exhibition Cos., Stamford, Conn. (203) 964-0000.

National User Applications Seminar. Atlanta, Oct. 14-15 — Contact: Bellcore TEC, Lisle, Ill. (708) 960-6000.

Hypertext '93. Seattle, Oct. 14-18 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

CAD/CAM, CAE Reseller/Systems Integrator Strategy Workshops '93. Boston, Oct. 15-17 — Contact: Trish Griffin-Silva, Daratech, Inc., Cambridge, Mass. (617) 354-2339.

OCT. 17 - OCT. 23

OS/2 Professional Interchange Conference. Palm Springs, Calif., Oct. 17-20 — Contact: OS/2 Professional, Rockville, Md. (203) 261-6227.

Scan-Tech '93. Philadelphia, Oct. 19-21 — Contact: Scan-Tech '93 Registration, Ventura, Calif. (800) 228-1064, ext. 117.

Advanced Application Development Technology Conference and Exposition. Boston, Oct. 18-22 — Contact: Digital Equipment Corp., Andover, Mass. (508) 470-3880.

C++ World. Dallas, Oct. 18-22 — Contact: SIGS Conferences, New York, N.Y. (212) 274-0640.

The Object Conference and Exposition (OBJEX). Boston, Oct. 18-22 — Contact: Digital Equipment Corp., Andover, Mass. (508) 470-0526.

Used/Refurbished Electronic Capital Assets (URECA). Las Vegas, Oct. 19-21 — Contact: Miller Freeman, Inc., Dallas, Texas (214) 239-3060.

Capacity Management Forum: "Performance of Networked Systems." San Francisco, Oct. 20-22 — Contact: The Institute for Computer Capacity Management, Inc., Phoenix, Ariz. (602) 997-7374.

Information Technology Association of America (ITAA) Management Conference. Seattle, Oct. 24-27 — Contact: ITAA, Arlington, Va. (703) 284-5355.

Common Desktop Environment Developers Conference. San Jose, Calif., Oct. 26-28 — Contact: Uniforum Association, Santa Clara, Calif. (408) 986-8840.

OCT. 31 - NOV. 6

Seventh International Conference on Design for Manufacturability. Orlando, Fla., Oct. 31-Nov. 4 — Contact: Management Roundtable, Boston, Mass. (617) 232-8080.

James Martin World Seminar. Los Angeles, Nov. 1-5 — Contact: Susan Levine, Extended Intelligence, Inc., Chicago, Ill. (312) 346-7090.

NOV. 7 - NOV. 13

1993 Info/Tech. Phoenix, Nov. 7-10 — Contact: DPMA, Park Ridge, Ill. (708) 825-8124.

OF YOU WHO DON'T

OUSE.

HOULD EVER

TIME.

5 Can your development tool build terminal applications that can later be migrated to Windows so you don't have to waste a zillion hours you don't have to begin with, rewriting . . . well, you know the story. ☐ Yes and I have a bridge to sell you. ☐ No

6 Is your development software portable across proprietary and open systems, supporting all major commercial UNIX and midrange platforms? ☐ Yes ☐ No, and I hope that I'm getting closer to that 800 number so I can place an order for PowerHouse already.





7 Do you realize that without PowerHouse, you will probably never be able to keep up with your current workload, let alone eliminate that three to four year average backlog of application development requests? (Rhetorical question)

8 Can you possibly resist finding out more about PowerHouse, the industry's best tool for your complex client-server applications? ☐ No, I can't resist. I am going to call 1-800-4 COGNOS, x81 as soon as I possibly can. ☐ Yes, I can resist. Sitting in front of the computer screen all those extra hours has finally affected my reasoning skills.

PowerHouse FROM COGNOS



High performance.

The drive to succeed.

What drives your business forward? Meeting your marketing objectives? Increasing your competitive edge? Delivering innovative products? It's probably all of these and more. And that's where SAP software can help.

We build software that can power your drive for success. In fact, SAP software is already doing that in nine of the top ten *Fortune* 500 companies. That's because the R/2 and R/3 Systems are ready-to-run, integrated solutions for today's business-critical problems. And, they deliver high-level performance in both mainframe and open, client/server environments. Add in support for multinational currency, language and legal requirements, and it's easier than ever for offices from Paris, France to Paris, Texas to work together.

So why not make the most of your drive to succeed? Call *1-800-USA-1SAP.* You'll find out how we can help keep your business on track--no matter what's around the bend.



Integrated software. Worldwide.™

©1993 SAP America, Inc.

HELP

Windows is driving me nuts!



ELLEN WEINSTEIN

Windows might not be ready for prime time networked environments, one IS pro is discovering. Why? There are no robust network management tools and few people expert in enterprise rollouts. Oh, and watch out for the Black Screen of Death. . . .

By Brien C. Boland

CORPORATE AMERICA, think twice befnre installing Windows 3.1 nn enterprise networked computers. Believe me, I know what I'm talking about. I've been technical lead nf a team that has struggled during the last year with two projects aimed at getting Windows up and running on 130 networked users' machines at my organization, a large internatinnal financial institution in Washingtnn, D.C. Currently, we're figuring out how to roll out Windows to about 2,400 other potential users at headquarters, and we don't relish the prospect.

I have a sense my story is nnt a nnique nne — that's why I want to tell it. Windows has thrown glitches at us such as the Black Screen of Death (mnre on that later). It doesn't yet seem to have the management tools commnn to hig systems environments. Perhaps more chilling is the apparent lack of Windows expertise available to help users. We've been trying to hire someone to join nur systems integration team to assist us in putting together a hearty Windows configuration, to nn avail (see story page 110). And Microsoft hasn't been much help, either.

After a string nf sleepless nights and watching my hair turn gray, I've decided the application jnst isn't ready for the wear and tear of a large networked setup.

Have nthers reached this conclusion as well? Maybe, considering how we found few organizations that were putting Windows to the test. To help us with organizing and standardizing our approach to a huge Windows rollout, we searched for some kindred company that might share its experiences. The single largest rollout effnrt we discovered was a gas company in Texas that brought Windows to 300 users.

Sure, there are other companies with more Windows nsers, but we found that these implementations were done in a spotty, individual and noncentralized fashion.

We have yet to find an organization our size running a similar network with similar applications that has converted its network to Windows from the ground up.

Time and money

At present, we have a projected budget of $300,000 and a time frame of six mnnths to figure out how to get Windows working smoothly in our organization.

"Working smoothly" means fitting Windows neatly in with our Ethernet-based Novell, Inc. NetWare network, which has 40-plus servers spanning three buildings. We run IPX, Transmission Control Protocol/Internet Protocol and NetBIOS. Our users have access, through the network, to an IBM 3090, a Unisys Corp. A17 mainframe, a Digital Equipment Corp. VAX 8600, a Hewlett-Packard Co. HP 3000 and six IBM RISC System/6000s. We have an X.25 gateway, an X.400 gateway and a Novell asynchronous server.

Existing applications include Lotus Development Corp.'s 1-2-3 Version 3.1 for DOS, WordPerfect Corp.'s WordPerfect 5.2 and Borland International, Inc.'s Paradox 3.5.

IBM Personal System/2s make up 80% of our PC hardware; the nther 20% comprises Compaq Computer Corp. dual-purpose machines (DPM). These machines are portable computers you connect to the network by inserting them into

Driving me nuts, *page 108*

Boland is lead technical member for the systems integration team at a large international financial institution in Washington, D.C., that is currently planning an organizationwide Windows strategy. He is on assignment from American Technical Resources in Annandale, Va.

Driving me nuts

CONTINUED FROM PAGE 107

a desktop base station.

With downsizing projects planned or in progress (we recently moved an accounting/payroll application off the Unisys mainframe and onto the Novell network), it has become imperative that we have a stable Windows configuration. Users need the features they are accustomed to, and information systems staffs need the kind of management and support oversight we're used to with large systems environments.

Unfortunately, Windows 3.1 out of the box does not provide all the features our users currently have, nor does it provide the tools for centrally managing the environment.

For instance, if Windows were installed on the network, what would happen to our DPM users when they took their machines away from the office? No Windows! Sure, we could install Windows locally for DPM users and on the network for desktop users, but that would result in supporting two configurations, making application distribution and upgrades a nightmare.

The idea of supporting two configurations becomes especially dicey when you consider that neither Microsoft nor third parties offers management tools for the Windows environment that are robust enough.

I found Winlogin, Windows' network-based configuration tool, to be very difficult to use and sparsely documented. Winlogin is supposed to maintain a central database of user configuration files that is accessed whenever a user starts Windows, but it has not always worked as advertised for us. Sure, Hermes — the company's next-generation network systems management facility with remote capabilities — is coming, but a source tells me it is still only in limited beta testing. We can't wait.

Third-party help limited

We've had to turn to third-party products — namely, Automated Design Systems, Inc.'s ADS NetTools, Saber Software Corp.'s LAN Workstation and LANovation's LAN Escort — with mixed results. Each of the three programs we've examined has some nice features, such as those that enable us to change configurations for a user or user group, to add or delete applications for a user or user group and to add or remove a printer from a user printer list.

But each falls short in some important area, including, for us, the ability to handle DPMs and to provide a robust scripting language. We have hundreds of macros written using WordPerfect Office 3.1. If we go to Windows, we need to find a robust scripting language that we can use to replace those.

ADS NetTools and LAN Workstation, for instance, are nearly mature, but they concentrate on network users and do not support our remote Compaq dual-purpose machine users well. Nor do they provide extensive options for arranging user desktops; they allow for subgroups, but that's about it.

LAN Escort, for its part, has solid network management features, but it has no scripting language, keyboard locking, screen blankers or support for remote Compaq users.

Last straw

To top things off, we figured out that the strain Windows puts on our network resources might even call for redesigning our current setup at great time and expense.

Using Network General Corp.'s Sniffer and HP's LAN Analyzer in conjunction with Novell's NetWare STAT NetWare Loadable Module, we got numbers on network utilization, server activity and load/runtimes using Windows.

We also tested loading Windows and running DOS applications, including WordPerfect 5.2, Lotus 4.0 and File Manager, on our workstations. Though our test analysis isn't done, there's one thing we noticed right away: Loading Windows on seven machines at the same time resulted in nearly 100% network utilization. Only seven!

In fact, the energy company in Texas told us that Windows on the network can quickly have a company talking superservers to provide adequate performance. The problem for us is that disk utilization on some of our servers is already dangerously high — about 50% to 80%. If we plan to load more software (Windows) and applications with larger executables (Windows applications are bigger), this could only aggravate the problem.

At this point, if we do end up going with a superserver (average hardware price is $140,000), our costs will skyrocket and our

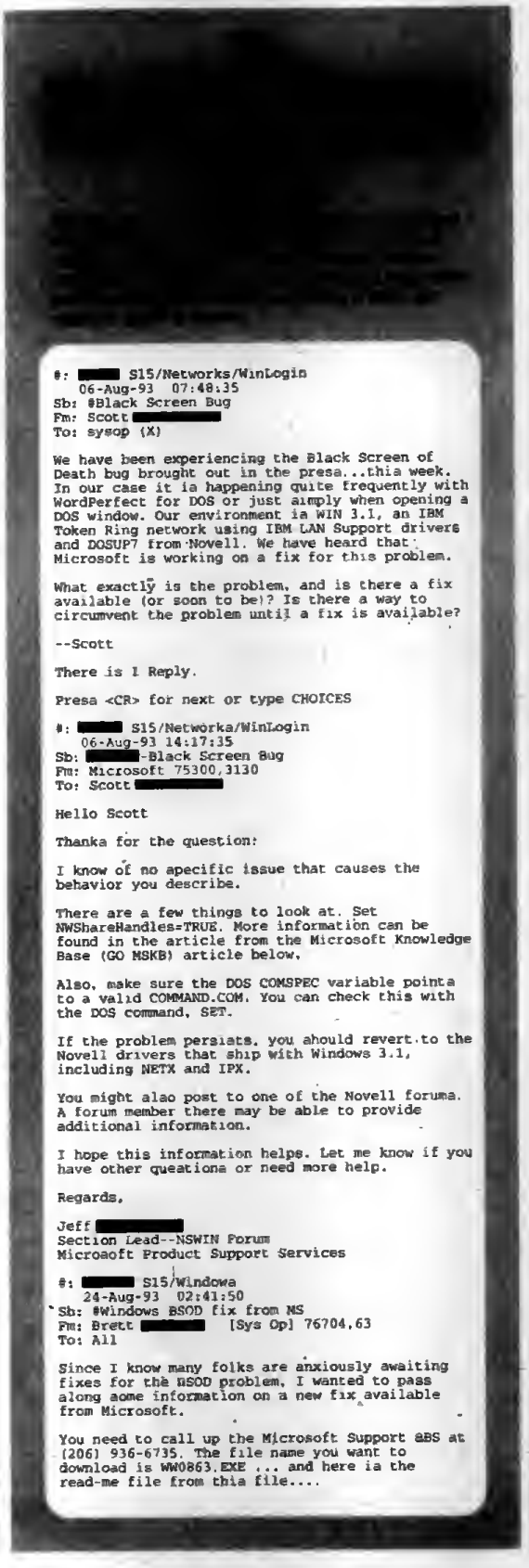
Nuts, *page 110*

EXPERIENCE COUNTS

In our quest to locate other companies that have migrated to Windows, we have researched forums and databases on CompuServe, talked with other Windows experts, asked Microsoft, scoured trade journals and done just about anything else we could think of.

We have been looking for a company with a centrally managed IS department that has conducted a strategic rollout process. Our purpose is to learn from others' experience. We would like answers to questions such as the following:

- What was the cost per workstation? Includes cost of upgrading PC base to run Windows, cost of additional software, cost of upgrading LAN infrastructure, cost of training users and cost of installing software.
- How much user training was required?
- Are you running Windows off the network, and if so, how is it managed?
- How are applications updated and distributed?
- What was the impact on network resources?



#: [redacted] S15/Networks/WinLogin
06-Aug-93 07:48:35
Sb: #Black Screen Bug
Fm: Scott [redacted]
To: sysop (X)

We have been experiencing the Black Screen of Death bug brought out in the presa...this week. In our case it is happening quite frequently with WordPerfect for DOS or just simply when opening a DOS window. Our environment is WIN 3.1, an IBM Token Ring network using IBM LAN Support drivers and DOSUP7 from Novell. We have heard that Microsoft is working on a fix for this problem.

What exactly is the problem, and is there a fix available (or soon to be)? Is there a way to circumvent the problem until a fix is available?

--Scott

There is 1 Reply.

Presa <CR> for next or type CHOICES

#: [redacted] S15/Networka/WinLogin
06-Aug-93 14:17:35
Sb: [redacted]-Black Screen Bug
Fm: Microsoft 75300,3130
To: Scott [redacted]

Hello Scott

Thanks for the question:

I know of no specific issue that causes the behavior you describe.

There are a few things to look at. Set NWShareHandles=TRUE. More information can be found in the article from the Microsoft Knowledge Base (GO MSKB) article below.

Also, make sure the DOS COMSPEC variable points to a valid COMMAND.COM. You can check this with the DOS command, SET.

If the problem persists, you should revert to the Novell drivers that ship with Windows 3.1, including NETX and IPX.

You might also post to one of the Novell forums. A forum member there may be able to provide additional information.

I hope this information helps. Let me know if you have other questions or need more help.

Regards,

Jeff [redacted]
Section Lead--NSWIN Forum
Microsoft Product Support Services

#: [redacted] S15/Windows
24-Aug-93 02:41:50
Sb: #Windows BSOD fix from MS
Fm: Brett [redacted] [Sys Op] 76704,63
To: All

Since I know many folks are anxiously awaiting fixes for the BSOD problem, I wanted to pass along some information on a new fix available from Microsoft.

You need to call up the Microsoft Support BBS at (206) 936-6735. The file name you want to download is WW0863.EXE ... and here is the read-me file from this file....

WINDOWS NT. NOW THE ONLY DIFFERENCE BETWEEN A PC AND A MAINFRAME IS ABOUT 900 LBS.



There's a new breed of hardware, with vast reserves of power. And the Microsoft® Windows NT™ operating system unleashes it all.

How? It gives you a platform for mini- and mainframe-class applications. In short, it lets you revolutionize the way you do business.

Now you can run a new generation of 32-bit applications (over 2,000 will be out within months). What's more, you can run them on everything from desktops to the most powerful superserver – all the while running your current MS-DOS® and Windows™ applications, and getting support from 15,000 professionals.

Plus, you can do it all in your existing computer environment. So call (800) 426-9400, Dept. KQ8, for a reseller nearby. And lose weight today.

Microsoft
Making it easier

© 1993 Microsoft Corporation. All rights reserved. Printed in the USA. Microsoft and MS-DOS are registered trademarks and Windows, the Windows logo and Windows NT are trademarks of Microsoft Corporation. For more information: In the 50 United States, call (800) 426-9400, Dept. KQ8. Customers in Canada, call (800) 563-9048; outside the United States and Canada, contact your local Microsoft subsidiary or call (206) 936-8661.

C++

Now the World's Leading Mainframe C Compiler Features Some Significant Pluses

Introducing the SAS/C C++ Development System from SAS Institute. Another first from the first name in C programming tools for the IBM mainframe environment.

A Plus for Productivity

C++ is an object-oriented superset of the C programming language that makes program development, use, and maintenance easier and more efficient. Now with the SAS/C C++ Development System, you can open the door to object-oriented programming on your IBM mainframes under MVS (batch and TSO) and VM/CMS while preserving your existing investment in C applications.

The SAS/C C++ Development System is fully compatible with the AT&T 3.0 release of the C++ language with the exception of template support. It implements the familiar constructs of the C++ programming language—including in-line functions, operator and function overloading, references, and free store management—providing a robust and productive applications development environment.

The enhanced SAS/C Full Screen Debugger, available with the SAS/C compiler, also supports C++, allowing you to debug C++ as well as mixed C and C++ applications.

A Plus for Portability

The SAS/C C++ Development System is an indispensable tool for migrating existing C++ applications developed in other environments. Applications built on UNIX workstations and PCs can be ported to the mainframe with minimal effort. As a result, your workstation becomes an effective platform for mainframe applications development.

Find Out More In A Free Report

To learn more about the pluses of C++ programming with the SAS/C C++ Development System, simply call or fax us today.

SAS

SAS Institute Inc.
Sales & Marketing Division
SAS Campus Drive
Cary, NC 27513
Phone 919-677-8000
Fax 919-677-8123

SAS and SAS/C are registered trademarks of SAS Institute Inc., Cary, NC, USA.
© 1993 by SAS Institute Inc. Printed in the USA.

Nuts

CONTINUED FROM PAGE 108

timetable will double. Before we can even think of superservers, we have to test, test and test again and likely redesign the network.

Ka-boom!

No amount of testing prepared us for the Black Screen of Death, a lovely little problem that locks up the machine, blacks out the screen and hangs the cursor in the upper left-hand corner of the display. This blackout occurs when a user receives a network broadcast message while switching among DOS applications under Windows. Apparently, the problem is a result of Windows' virtualizing network communications. When it receives the message, Windows sends it to the wrong window and *boom*!

According to press accounts, Microsoft has been reluctant to acknowledge this bug's existence. We certainly had tronble getting the company to tell us anything about it when we contacted the SysOp early last month (see correspondence page 108). So we forged ahead, researching CompuServe and other user forums to come up with a fix. We installed the latest open data link interface drivers, tweaked the TimerCriticalSection setting and prevented NETBIOS.EXE from loading, among other things. Microsoft, for its part, offered users its own advice late last month.

At this point, we're not having the problem, but I'm still not sure exactly which part of my fiddling got rid of the Black Screen of Death.

Just as ugly is the DOS Manager error, which first cropped up during design testing for our accounting/payroll downsizing effort. While switching among multiple DOS applications, we would randomly get a Windows error message and have to reboot the machine.

We found that increasing the TimerCriticalSection setting (which instructs Windows to go into a critical section around all timer interrupt code and specifies a timeout period) and switching the network boards from Standard Microsystems Corp. to 3Com Corp. all but got rid of the problem. When we added Novell's open data link interface network driver files, the problem went away. But when my organization standardized on a newer 3Com network-integrated circuit board with our PS/2 Model 90s, guess what came back? Yup, the DOS Manager error.

We have worked with Microsoft technical support on this problem, including ongoing support calls with engineers. I asked them to look at their code and tell me what triggers the problem. It's been more than a year, and no word.

Because of these ills, I discovered the importance of the Novell Novlib forum on CompuServe. From it I download files such as DOSUP7 and WINUP7, which contain network driver files and Windows systems files used for network communications. New WINUP and DOSUP files are published to fix many known bugs. I also accessed WINTIP.TXT, a text document containing common Windows problems and solutions.

To date, Microsoft has only provided reasons for indecision. We continue to forge ahead with Windows 3.1, waiting for the company to provide details on NT, Chicago (Windows 4.0) and Hermes.

So, if you plan to migrate to Windows, beware. The move affects all aspects of your enterprise computing environment, and there is no precedent or easily available expertise to count on. ■

HUNT FOR AN EXPERT

We desperately need one more member of our systems integration team to help us figure out whether Windows can work for us and, if so, help with implementation. But I have not yet been able to locate anyone available who has the kind of knowledge we need. And it's not from lack of trying.

We have had at least five recruiting firms sending us dozens of resumes. I have conducted more than 40 technical interviews. They tend to go like this:

Q: So, you consider yourself a Windows expert?
A: Know it forward and backward. I have installed countless copies and have worked with it since Windows 286.

(At this point I'm saying to myself, "Thank you, God. Please let it be true.")

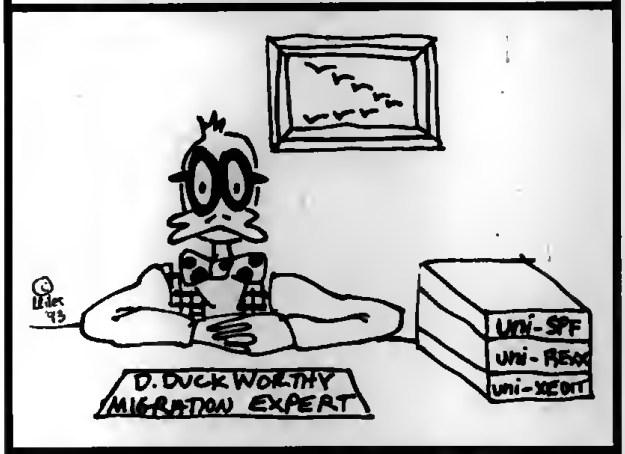
Q: Great, so do you know what a TimerCriticalSection is?
A: No, can't say I do.

Q: Are you familiar with DOSUP7 and/or WINUP7?
A: No.

Q: So in all your Windows installations in the past, you just used the files straight out of the box?
A: Well, yes.

Thank you very much for your time. We'll be in touch.

I know how difficult a big migration can be... Make your migration from an IBM mainframe to Unix a lot easier with uni-SPF, uni-REXX and uni-XEDIT.



wrk/grp
the workstation group

the business choice for open systems
1-800-228-0255

More Application Development!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I want more. I accept your offer of $42.95* for 51 weekly issues. That's a savings of over $5.00 off the basic subscription rate.



First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY (Circle one)**
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medical/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government - State/Federal/Local
   65. Communications Systems/Public Utilities/Transportation
   70. Mining/Construction/Petroleum/Refining/Agriculture
   80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   90. Computer/Peripheral Dealer/Dist./Retailer
   99. Other _____ (Please Specify)

2. **TITLE/FUNCTION (Circle one)**
   IS/MIS/DP MANAGEMENT
   19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   21. Dir./Mgr. MIS Services, Information Center
   22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm. Network Sys. Mgt., LAN Mgr., PC Mgr.
   23. Dir./Mgr. Sys. Development, Sys. Architecture
   31. Programming Management, Software Developers
   41. Engineering, Scientific R&D, Tech. Mgt.
   60. Sys. Integrators/VARs/ Consulting Mgt.

   CORPORATE MANAGEMENT
   11. President, Owner/Partner, General Mgr.
   12. Vice President, Asst. VP
   13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   51. Sales & Mktg. Management
   70. Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   80. Educator, Journalists, Librarians, Students
   90. Other Titled Personnel

3. Are you involved in the purchase or use of the following (Circle all that apply)
   a. Networking/Communication Equipment
   b. PCs/Workstations
   c. Large Scale/Midrange Systems
   d. Software
   e. Peripherals

E4337-3

More Enterprise Networking!

51 Issues for ~~$48~~ Now Only $42.95

Yes, I want more. I accept your offer of $42.95* for 51 weekly issues. That's a savings of over $5.00 off the basic subscription rate.



First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: ❑ Home ❑ Business ❑ New ❑ Renew Basic Rate: $48 per year

* U.S. Only. Canada $74.97, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY (Circle one)**
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medical/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government - State/Federal/Local
   65. Communications Systems/Public Utilities/Transportation
   70. Mining/Construction/Petroleum/Refining/Agriculture
   80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   90. Computer/Peripheral Dealer/Dist./Retailer
   99. Other _____ (Please Specify)

2. **TITLE/FUNCTION (Circle one)**
   IS/MIS/DP MANAGEMENT
   19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   21. Dir./Mgr. MIS Services, Information Center
   22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele Comm. Network Sys. Mgt., LAN Mgr., PC Mgr.
   23. Dir./Mgr. Sys. Development, Sys. Architecture
   31. Programming Management, Software Developers
   41. Engineering, Scientific R&D, Tech. Mgt.
   60. Sys. Integrators/VARs/ Consulting Mgt.

   CORPORATE MANAGEMENT
   11. President, Owner/Partner, General Mgr.
   12. Vice President, Asst. VP
   13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   51. Sales & Mktg. Management
   70. Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   80. Educator, Journalists, Librarians, Students
   90. Other Titled Personnel

3. Are you involved in the purchase or use of the following (Circle all that apply)
   a. Networking/Communication Equipment
   b. PCs/Workstations
   c. Large Scale/Midrange Systems
   d. Software
   e. Peripherals

E4337-3

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

Computer Careers

Getting a foothold in client/server

Advice for client server job-seekers



BY LEE ANN HANTULA

Hantula is a senior analyst at McCall Consulting Group, Inc. in Atlanta. She has been developing client/server applications for two years.

Q We already have PC LANs for file and print services, but we are starting a client/server project soon. I'm a senior member of the application programming team. How should we approach training?

A Take it step-by-step. Don't cram all your training in at once. Because you already have LAN skills, move to the database. If your company's database is not already relational, learn SQL. Most training programs for client/server tool sets will assume this knowledge. Practice using SQL and start designing your database. It doesn't need to be perfect. The last step will be learning the programming language or tool set.

KEEPING up

Q My company is talking about client/server, and I want to be selected for the development team. How can I improve my chances?

A Make it known that you want to do it. Unless you have established a reputation at your company for being a technical trailblazer, you may have to convince them on your own time.

Graphical user interfaces (GUI) are common in client/server, so basic desktop computing literacy is necessary. Learning GUI-based office automation tools is good exposure to GUI principles.

In the networking arena, an excellent starting point for people with little communications background is *Computer Networks*, by Andrew Tanenbaum, which explains the theoretical underpinnings of almost all LAN and WAN protocols.

If you prefer systems or applications programming, and your background is in Cobol, RPG or a fourth-generation language, consider a programming course in C. Some client/server tools are written in C, and companies are more likely to hire and train former C programmers than Cobol programmers. Also, become familiar with object-oriented principles, but don't make it a top priority.

Finally, learning a relational database is important for application designers. SQL is especially practical. However, if the company wants to hire someone with database administration skills, lobby for a position as backup administrator.

Q I am an AS/400 applications programmer and want to move to client/server. My company doesn't want to switch anytime soon, however. How can I make myself more attractive to other firms?

A Don't discount your Application System/400 skills. I see many AS/400s acting as servers, at least part-time. Most people I know were able to move to client/server without changing jobs. Leverage your knowledge of your company's business, its legacy systems and your working relationships with members of the user community. Good old-fashioned systems design and project management skills never go out of style.

If you decide to change jobs and your target company uses a tool kit such as Powersoft Corp.'s PowerBuilder or Gupta Corp.'s SQLWindows, learning these skills is crucial. Training costs may be prohibitive, however. Also, learn C. One way to get hands-on experience is to volunteer at a nonprofit organization that needs a systems solution.

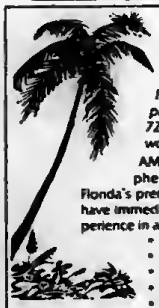
One of my colleagues expanded his SQLWindows knowledge by writing an application to track swimmers in a Georgia Special Olympics event. He learned a new skill and got brownie points for his charitable contribution.

Q What is the most difficult aspect of making the transition from centralized architectures to client/server?

A Any big change requires the willingness to take a risk. Client/server, in particular, takes extra patience because the tools are still immature. Client/server is also characterized by mixtures of different vendors' products, so you can't just turn to one vendor for support.

I find networking the most daunting, and evidently, so do others because network experts are the most in demand of any client/server specialist. Networking is also the most difficult skill to learn on your own.

In my experience, the only people who fail to make the transition are those who panic. Don't be afraid to ask questions. Everyone is still learning. The need for client/server skills is outstripping the supply and will probably do so for at least another year.



Florida
DON'T DREAM THE LIFE, LIVE THE DREAM!!!

Florida, with gentle winds bending the palms and an average temperature of 72°, is one of the finest places to live and work.

AMD Consulting Services is experiencing phenomenal growth. Our customers, Florida's premier information processing centers, have immediate needs for professionals with experience in any of the following:

- COBOL, PLI, ALC, RPG3, "C", CICS
- FOCUS, ORACLE, INFORMIX
- DB2/SQL, IDMS, M204, IMS
- TANDEM COBOL, TAL, PATHWAY
- DEC/VAX, UNIX, AIX, OS2, PICK
- PAC BASE, MCCORMACK & DODGE

It's your move, make it the RIGHT ONE.

AMD CONSULTING SERVICES

120 West Hyde Park Place, Suite 310C, Tampa, Florida 33606, (813) 229-9306

COMPUTER CONSULTANTS
We survived the flood, how about you!!!
Contract and permanent positions available

Attn. Systems Prog/Analysts:
- INFORMIX
- Visual Basic
- AS/400 RPG/400
- Prime/Pick/INFO
- Excel

Sys. Admin.
- UNIX, DOS, Novell TCP/IP, Windows, NFS, Ethernet or Token Ring
- Primos, Infoboatic, Unix, R5/6000 & SNA a +

Help Desk:
- Vax Pathworks, PC & + variety of pkgs

Attn: Lisa
Prog/Analysts:
- Cyborg
- CODA/VMS
- AS/400 RPG/400
- EMS/Powerhouse
- LINC II
- CA-SAAVII
- Centron/Sterling Software
- American Software

Attn: Rabbi
Sys Admin:
- HP-UX

PC Prog:
- Strong C exp with CTREE

MR Associates, Inc.
NACCB Member

Please Reference Job # CW-1
P.O. Box 1726, St. Louis, MO 63043, (314) 434-1976 • FAX 434-0163



an international leader in Data Processing Consulting
We have immediate contracts, paying up to
$14,000 per month!
and selected positions paying up to
$100,000 + Full Benefits

CLIENT SERVER TECHNOLOGIES
Power Builder ☐ Visual Basic ☐ Windows/SDK
MS Access ☐ Windows NT ☐ FoxPro 2.5 ☐ GALAXY

MAINFRAMES
DB2/COBOL II ☐ DB2/CICS/QMF
Focus MF/PC DB2

UNIX OPEN SYSTEMS
C++/C Developers ☐ SQL Solutions ☐ UNIX/CICS
Sybase Administrators/DBAs ☐ NeXTSTEP
SUN Administrators/SUN OS ☐ TUXEDO

For an immediate interview, Fax/Send/Call Jeff Porter

tangent
International Computer Consultants Inc
30 Broad Street, 44th Floor New York, NY 10004-2304
212-809-8200—212-509-6578 Fax

CONTRACTORS!

SEEK+ CONSULTING

SEEK Consulting is a leading professional services firm that provides highly skilled MIS and software development professionals on a contract basis. Contact us immediately to learn about current contract opportunities.

- ▲ Business S/W's, Fin. Svcs.**
- ▲ CICS, COBOL II, Mutual Funds**
- ▲ DB2, IMS, CICS, MICROFOCUS COBOL
- ▲ PYRAMID, UNIX, TUXEDO, ORACLE**
- ▲ Relational DB Developers, SQL, ORACLE, SYBASE, MS Server, INFORMIX, INGRES
- ▲ COBOL, VSAM, DOS/VSE, P/W's, S/W's
- ▲ Entry-level Comp. Science grads††
- ▲ OO Analysts, Designs, Methodologies
- ▲ DBAs, SQL Server, SYBASE, ORACLE††
- ▲ C, C++, UNIX, SYBASE, SQL, Asm/Bynet
- ▲ C, C++, MS-Windows, XWS, DOS, OS/2††
- ▲ C, C++, OS/2, Presentation Mgr.
- ▲ Visual C++, Visual Basic, PowerBuilder
- ▲ Gupta SQL Windows, X-Shell

** 12-18 mos. contracts available
†† Full-time opportunities also available

Account Executives - SEEK's continued growth has created excellent sales opportunities for bright, aggressive professionals.

401 Edgewater Pl. #430, Wakefield, MA 01880 | (800)-274-1174 | FAX: 617-246-8246 | In Mass: 617-246-8234
Internet: Seek@world.std.com

ATLANTA BOSTON WASHINGTON D.C.

BECAUSE YOU'RE IN GOOD COMPANY...



IDEAS GO FURTHER.

When people work well together, it shows in everything they do. This is why SAFECO has been responsible for so many industry innovations - like the first to use computers in-house. In our company, sound ideas have a way of becoming reality.

SAFECO also prides itself on treating our customers with empathy, decency and integrity. Therefore, we seek those qualities in the people we employ. This creates an environment where people respect and support each other to succeed.

We currently have the following positions available in our Home Office, located in **Seattle, Washington**. Here, you'll find three national parks within two hours' drive, an abundance of recreational activities and all the cultural events you would expect to find in a major metropolitan area.

DB2 Database Analyst

Work in a group whose responsibilities include definition and support of the corporate DB2 environment, plus DB2 Database Administration for various applications. Individual assignments are based on skills and interests in:

- Systems Administration (system performance, tuning, configuration, support BMC utilities and other add-on products)
- Database Administration (logical design, modeling, physical design, utilities)
- Application Development Support (SQL review and tuning, programming standards, consulting)

A Bachelor's degree and at least 2 years' experience in DB2 DBA or DB2 Systems Administration preferred. IMS knowledge or on-line application programming experience desirable.

Systems Programmer

In support of our MVS/ESA shop, you'll maintain and install VTAM and other communications related systems software, including supporting the VTAM/NCP generation process. This will involve assisting with the development of performance monitoring tools and system software components as well as providing technical direction to other departments. You will need a BA/BS or equivalent, 5+ years' related experience in a large IBM environment providing Network and related systems support as well as a working knowledge with SMP/E and Assembler. Some CICS background is desirable.

Sr. Communications Analyst

We are looking for an individual that has multi-vendor systems integration experience. Working in our Network Control Center, you will be responsible for planning and ongoing support of our WAN/LAN environment. To qualify, you must have a minimum of 5 years' experience with complex data networks and mainframe software and hardware. Prior experience must include supporting 37X5, 3X74, 3270 protocols, SDLC/SNA, LLC, TCP/IP, IPX and other CCITT routable protocols. The ideal candidate will also have working experience with MVS/VTAM, NCP and Netview.

SAFECO offers competitive salaries and an excellent benefits package. For immediate consideration, send your resume and salary history, referencing the position title, to: SAFECO Corporation, SAFECO Plaza, Personnel T-17, Seattle, WA 98185. You may also FAX your resume to (206) 545-6362. We are an equal opportunity employer committed to hiring a diverse workforce.

SAFECO®

Client/Server Professionals

Claremont Technology Group, one of the fastest growing systems integration companies in the United States is headquartered on the West Coast in Portland, Oregon and has a Midwest office in Columbus, Ohio.

Claremont has a well established reputation for building large mission critical business applications using I-CASE tools and disciplined software engineering methods. We are aggressively expanding our practice into providing complete business solutions on scalable Client/Server architectures.

Claremont is looking for Senior Technical Leads and Technical Architects in application development and networking for Client/Server and/or UNIX* based applications. You must be an aggressive and highly motivated individual who enjoys challenges in leading-edge technology and seeks continuous professional growth. To qualify, you must have 2+ years of direct application development experience in Client/Server and/or UNIX environments. You must also have significant hands-on experience in one or more of the following areas:

Application Development
- Object-Oriented Programming: SmallTalk (preferably VisualWorks) and/or C++
- Object-Oriented Analysis/Design Methods and CASE Tools
- PowerBuilder
- VisualBasic
- Relational DBMS. Preferably Sybase or Oracle

Networking
- Novell Netware 3.1, CNE
- TCP/IP
- SNA

Claremont Technology Group offers outstanding salaries and an excellent benefits package. For immediate consideration, please send or fax your resume to: **Client Server Division, Dept. CWL-0830, Claremont Technology Group, Inc., 1600 N.W. Compton Drive, Suite 210, Beaverton, OR 97006, Fax (503) 690-4004.** For more information, please call **David Howitz at (503) 690-4000.** An Equal Opportunity Employer.

*UNIX is a trademark of UNIX Systems Labs.

claremont
Technology Group, Inc

STATE OF FLORIDA CHIEF INFORMATION OFFICER

The Department of Health and Rehabilitative Services currently has a challenging opportunity for a Chief Information Officer to direct the information technology activities of the largest state agency in the nation.

The Information Systems division has a budget in excess of $60 million and employs over 400 staff and contractors.

The successful candidate will be responsible for strategic planning, development, implementation, maintenance, and operation of the statewide information technology solutions for the department and coordinating these services with other departments.

Candidates should have experience in management of a similar environment, with preference for experience in the social services governmental arena. Management of extensive maintenance activities with initiatives toward reengineering as well as operation of a multi-platform/vendor environment (Unisys A19 COMS and IBM ES9000 IMS operating environments) are also desirable.

An established network with the federal oversight agencies, HHS and USDA, will be very helpful. Demonstrated success in public administration and associated regulations and state oversight entities are critical success factors. This job will require interaction with outside interested parties regarding complex, highly visible projects.

It will provide an opportunity to join a newly formed executive team in reengineering the department.

Minimum requirements are a bachelor's degree and extensive experience managing information technology in a large corporate or governmental environment. Location is Tallahassee, Florida. Salary is negotiable.

If you are interested in this challenging opportunity, submit your resume/salary requirements to:

Vivian Pyle
HRS Personnel Officer
1317 Winewood Boulevard
Bldg. 3, Room 219
Tallahassee, FL 32399-0700
Deadline September 24, 1993

NO DOWNTIME
ONE RESUME – 100's of Assignment Possibilities

Keep working by simply forwarding a resume to our National Recruiting Center. Get a world of attention with just one contact. Our National contract assignments include: Washington, D.C., Massachusetts, Florida, NY/NJ, Texas, Colorado, Arizona, N. Carolina, Pennsylvania, Chicago, Iowa, Atlanta, and Dallas.

Our programmers and software engineering employees enjoy weekly pay, a wide variety of projects, resume and interview guidance, and star treatment. Many positions are salaried with benefits.

Here are a few of this week's requirements:

• UNIX/C	• SMALLTALK
• PEOPLESOFT	• ADW 2.7
• POWERBUILDER	• ORACLE
• OS2 "C"	• HP 3000 POWERHOUSE
• PRESENTATION MGR.	• ENVISION
• AS 400	• PARADOX
• CICS DB2	• ADABAS/SOL
• SYBASE	• STRATUS/PL-1
• VISUAL BASIC 3.0	• MG 8000 "C"
• FOCUS QA	• AIX, "C"
• ADA	• BUSINESS SYSTEMS ANALYST
• MILO/MSA	• INQUIRE/MACRO/SPF

At The Experts - time is money!! Don't waste either - Fax or Mail resume immediately to The Experts National Recruiting Center, 200 Reservoir St., Needham, MA 02194. Fax number: (617) 444-6716.

The Experts

SOUTHEAST

We have contract and permanent positions available now:

- POWERBUILDER
- SYBASE
- POXPRO, C++
- UNIX, C
- AS/400, RPG
- AS/400, ASI or MRP
- PROGRESS/SYMIX
- DB2
- PROJ MGR - C/SERVER
- MODEL 204

MAJESTIC SYSTEMS, INC.
2500 Hillsboro Rd.
Nashville, TN 37212
Call 615-292-6174
Fax: 615-297-0114

Programmer/ Analyst

We are a growing AS/400 D80 operation serving multiple criminal justice agencies. Applicants must be experienced on AS/400 or System/38 and proficient in RPG. Excellent salary and benefits package. Send resume to:

ORLEANS PARISH CRIMINAL SHERIFF'S OFFICE
COMPUTER CENTER
2800 GRAVIER ST.
NEW ORLEANS, LA 70119

CW Systems Inc.

CW Systems Inc. is a leading consulting firm specializing in custom software development. Full-time or contract positions available for Senior Consultants and Programmers. If you are skilled in one or more of the following areas, please mail or fax your resume:

- ORACLE
- C++, WINDOWS
- COBOL, CSP, DB2
- COBOL, CICS, DB2
- ADABAS, NATURAL 2
- POWERBUILDER, SYBASE
- OS/2, APPLICATIONS MANAGER

14643 Dallas Parkway
Suite 865, Dept. CW-9/13
Dallas, Texas 75240
(800) 375-4604
Fax: (214) 980-0076

• Austin • Dallas • Houston • Oklahoma City

The career road less traveled

By Leslie Goff

JIM HOWELL started his information systems career on an assembly line in the small central Texas town of Temple. Today, he's a key player in the implementation of a wide-area network for the Lower Colorado River Authority (LCRA) in Austin. The real story, however, is how he prepared himself for this position with little formal training.

When the LCRA — a nonprofit, quasi-state agency that manages the resources and conservation of the 600-mile long Lower Colorado River — hired Howell, it was gearing up for a 10-year strategic IS plan. The LCRA was planning to build an Ethernet network linking a mainframe, a Digital Equipment Corp. VAX and more than 900 PCs and servers across 43 counties in central Texas.

Howell was originally brought in for his PC support and local-area network experience. His resume also included self-taught PC programming skills that he sharpened with on-the-side consulting jobs and in-depth knowledge of electronic components and PC hardware.

Now, a senior systems analyst with networkwide responsibility for the roll-out of new database applications, Howell says he was attracted to the LCRA because of the opportunity to build a new network.

"Here was a company that had a pretty minimal network. It was like starting with a blank slate. I took a pay cut to come here because there were so many things that leveraged all my prior experience," Howell says.

Howell spent his first 18 months at the LCRA evaluating, specifying, purchasing and installing network hardware and software. He recently began prioritizing and deploying database applications across the myriad functions in the company. He will also manage the LCRA's Enterprise Network Group.

Self-made man

During the past 11 years, Howell has propelled himself to new jobs with skills developed through reading and tinkering but very little formal training. He landed his current position after having taught himself "just enough [Novell, Inc.] NetWare to market myself" while on the job at direct-channel PC vendor CompuAdd.

Even though he had built LANs using Digital's Pathworks LAN operating system, learning NetWare was "like starting from scratch," he says.

"NetWare and Pathworks are completely different — the concepts, the commands, the core components are not alike at all. I think I lied to CompuAdd about how much I knew about NetWare and then went to the bookstore."

For Howell, it has been a self-managed apprenticeship. He learned Basic while working on a printed circuit board assembly line. He taught himself electronics while working at a burglar alarm company and developed PC-based inventory management applications for a small construction company. He improvised when working on his first LAN at a chip manufacturer.

"My perception was that I had to learn everything about hardware, software, networks and internal components, and then it would be time to move into a position where my opinions would mean something," Howell says. "I didn't want to be the guy who always fixed things. I wanted to have upfront responsibility for planning and implementation."

Goff is a free-lance writer in New York.

Upwardly mobile

Jim Howell has taken a self-managed apprenticeship approach to his career. Highlighted are responsibilities that he considers have directly contributed to success in his present job.

1992-present
Senior systems analyst
Responsibilities include specification, evaluation and purchasing of network gear; choosing a corporatewide database; deploying departmental database applications; and end-user support in a LAN/WAN environment.

1990-1992
Senior engineering technician
Tested and burned PCs for Digital Equipment Corp. PathWorks and Novell, Inc. NetWare certification; supported NetWare LAN in engineering department.

1987-1990
Technician/senior technician
Installed, supported and maintained 1,000-plus node PathWorks LAN. Maintained engineering production database tracking quality-control parameters.

1986
Moved to Austin, Texas, and took short-term job programming a PC-based inventory control system.

1985-1986
Electronics technician
Taught himself principles of electronics.

1982-1985
Line worker/process engineering assistant
Assembled printed circuit boards; taught himself Basic; wrote small quality-assurance programs.

* Not all responsibilities are listed

Lessons learned

We asked a few IS experts to comment on Jim Howell's journey to a senior systems analyst position and add their own suggestions for others facing a similar requirement.

Michael Sinovitz, network specialist at Dandelion's Floor Foods, Inc. in Northlake, Ill.: "The best education you can get is to pick up a book and read. It's hard work, but it pays."

Dave Wilkes, director of network management at American Greetings Corp. in Cleveland: "He took responsibility for his own development, and you can't do that sitting in front of the TV at night. To succeed in this industry, you have to read nonfiction management books."

Matthew Cain, program director of the Workgroup Computing Strategies Service at Meta Group, Inc. in Westport, Conn.: "It shows that the ability to recognize the value of a technology early on is beneficial. His career has paralleled the PC technology's evolution."

CONSULTANTS
Immediate Interviews
MAINFRAME: DB2/CICS Natural 2 • Internals • CSP Bachman • DASD • Focus CASE • VAX/RDB • Telon CICS/Brokerage • Jacobson
CLIENT SERVER: Peoplesoft • Powerbuilder Sybase/DBA • Sybase Devl C++ • Foxpro • Autocad Smalltalk80 • Sys/Admins Windows • Ethernet • Informix Market Data Analyst • Oracle Cisco • Visual C/C++ • HP
Robin Rogers Consulting
1212 6th Ave, 9th fl, NYC 10036
800-326-5995
212-921-1319
Fax 212-302-4063

IMMEDIATE OPPORTUNITIES
Data Processing Professionals with the following skills:
• Adabas Natural (Construct)
• IMS Systems Programmers
• DB2/APS
• C/UNIX/Sybase
• Ask MAN-MAN X
• Netware Loadable Modules (NLM)
• People Soft
• Arbins Applications exp.
• Document Imaging exp.
• UNISYS "A" Series
• VAX/VMS/C/RDB
• UNIX System Admin (w/Sybase)
• Telecom Order Entry exp
• Telecom x.400 and/or x.500 exp
For more information, call or fax resume to Vista Computer Services, 800-926-0361 or fax 703-222-1930. Send resume to Attn: Ira Gotlieb, Vista, 4350 Fairlakes Court, Ste 150, Fairfax, VA 22033

Our Clients Consult With the Best...
...GILCOR ENTERPRISES, INC. and you!
Headquartered in Chicago, we are a nationwide consulting firm with upcoming projects in the Midwest and Atlanta areas. We are looking for Technical and Analytical Consultants on a per project basis. Qualified candidates will have senior level experience in one or more of the following areas:
• UNIX, C, C++ • JAD/RAD • DB2 DBA
• ORACLE DBA • Data Administration
• Client/Server; OS/2, WINDOWS
• IMS DB/DC and TELON
• Process Improvement Analysts
• MVS, NCP/VTAM Systems Programmers
Willingness to travel preferred.
Please mail or fax your resume with salary history (principals only, please) to:
GILCOR ENTERPRISES, INC.
Attn: Ms. Judy Reinhardt
17W220 22nd Street, Suite 310,
Oakbrook Terrace, IL 60181-4477 Fax: (708) 990-0300
Equal Opportunity Employer

CONSULTANTS
CREDIT CARD
PROGRESS
HOGAN
TERADATA
INGRES
ATT/NCR 3XXX
SYSTEMS & NETWORKING
IMMEDIATE OPENINGS
RESOURCE SOLUTIONS INT'L.
3030 LBJ FRWY., SUITE 300
DALLAS, TX 75234
800-288-1110 FAX 214-243-8316

SOUTHEAST OPPORTUNITIES
Technology Consulting, Inc. is a dynamic and rapidly growing Software Development Company with challenging assignments. Our immediate and continuing needs are:
SYBASE/CLIENT SERVER (TRAINING AVAILABLE)
• CICS, DB2
• DEC/VAX, C
• SAS, REXX, VM
• ALLEN BRADLEY
• NATURAL/ADABAS
• AS400, RPG400
• IMS DB/DC
• IDMS/ADSO
• TANDEM
• OS/2, GUI
• ORACLE
• C++, GUI
TCI offers competitive salaries, attractive benefits, and relocation assistance. For consideration, send resume or call
TCI
1800 Meidinger Tower Louisville, KY 40202
(502) 589-3110 FAX (502) 589 3107
Member NACCB

CA & AZ Contracts
P. Murphy & Assoc.
4405 Riverside Dr #100,
Burbank, CA 91505
(818) 841-2002
FAX (818) 841-2122
Member NACCB

Surrigal Opportunities
UNIX/SYBASE PA's 35-40K
Advnc SPT PA's 35-40K
SMALLTALK 40-60K
DATACOM/IDEAL PA's 40-60K
HOGAN PA's 40-60K
ORACLE/UNIX PA's 40-60K
Foxpro & PowerBuilder 35-40K
IEF ADW IEW PA's 35-40K
DB/DC/CICS PA's 35-40K
UNIX/C++ 35-40K
IEW Authors 35-40K
VMS/CPM/MS 35-40K
Opportunities in the Southeast and nationwide. Fee Paid.
CORPORATE STAFFING CONSULTANTS, INC.
P.O. Box 221736
Charlotte, NC 28222-1736
(704) 366-1660
Attn: Don Mullis

ORACLE
Positions open now and starting third and fourth quarters of 1993 will result in long term development efforts for Technical Project Leaders and Sr P/A's. Opportunities require proven expertise in ORACLE. Full-Time or Hourly (W4).
OMNItech — Consulting Services Inc
Forbes Plaza / Forbes Center
Edison, New Jersey 08837
(908) 225-9577 - Phone
(908) 225-0537 - Fax

PORTLAND, OREGON
Pacific Data Group is the #1 Information Systems Consulting company in Oregon, and one of the highest rated employers in the state. If you're moving to Portland, check us out! Current Job Openings: Hourly W-2 Consultants and Salaried Data Processing Professionals (all levels: Sr. S/A, S/A, Sr. P/A, P/A, Software Developer, Software Engineer).

Mainframe:	DB2, CSP, CICS, IMS DB or DC, TIS, IDMS ADSO, Case (IEF, ADW, IEW)
Client/Server:	Oracle, Sybase, Unix, C, C++, PowerBuilder Paclbase, AS400, Synon, Visual Basic, Windows, Progress, HURON
Other:	Banking, (Wagon, PEP+, ACAPS, SHAW, etc.), Welsh/G/L, Utility Customer Systems

Mail, Phone, or Fax: Pacific Data Group, One Lincoln Center, 10300 S.W. Greenburg Road, Suite 250, Portland, Oregon 97223. FAX#: (503) 293-3000 Phone#: (503) 293-3400.

COMPUTER CONSULTANTS

...changing economic climate, constructing teams to define ...of the future. If you have 1+ years of experience in the ... of Software Engineering or Information ... we would like to meet with you.

SOFTWARE
- ... WINDOWS/C++/TEST OR DOC
- ... /SYS ADMIN/NETWORK
- ... 3/C++/INFORMIX
- ... DESIGN/C++
- ... PROGRAMMING

INFORMATION SYSTEMS
- SQR/DATABASE DESIGN
- SYBASE/UNIX/IAM
- PC/PROGRESS
- HP3000/POWERHOUSE/COBOL
- CICS/COBOL/FINANCIALS
- BUS. ANALYST (TRUST & CUSTODY)
- IMS DB/DC COBOL (STRONG)
- ... CICS/VSAM
- C++/UNIX/ORACLE
- COBOL/VSAM/CICS (CICS A PLUS)
- ... /COBOL/ORACLE A PLUS)
- ... /UNIX/DATABASE APPS
- ... Information Systems

National
Tel: 800/876-9939
Fax: 617/935-7041

Boston, MA
Tel: 617/227-1212
Fax: 617/227-4837

Woburn, MA
Tel: 617/938-1910
Fax: 617/935-6760

Chicago, IL
Tel: 312/214-6100
Fax: 312/214-3756

Atlanta, GA
Tel: 404/551-0130
Fax: 404/551-0137

Tysons Corner, VA
Tel: 703/847-3650
Fax: 703/761-7095

BENEFITS

NEW BOSTON

CONSULTING

DATABASE
- ORACLE
- IDB
- DB2
- ACCESS
- ADABAS
- IMS
- PROGRESS
- CUSTOM
- INFORMIX

LANGUAGES
- COBOL
- ADA
- MICROFOCUS COBOL
- C, C++
- ASSEMBLY
- NATURAL
- RPG
- VISUAL BASIC
- POWERHOUSE

GRAPHICAL USER INTERFACE
- MS WINDOWS 3.1
- WINDOWS NT
- X-WINDOWS/MOTIF
- PRESENTATION MANAGER

COMMUNICATIONS
- ARN
- TCP/IP
- PATHWORKS
- X.25
- PSDN
- BANYAN
- X.400, X.500
- SONET
- NOVELL

CONSULTING SOLUTIONS

Two Hampshire Drive
Salem, NH 03079-4875

603-893-6776
Fax: 603-893-6088
1-800-998-CSI 1 (2741)

Systems Analyst to analyze, design, develop, test & maintain a wide range of financial applications related to securities processing, mutual funds accounting, retail banking, & credit card processing. Design & develop large scale applications on client server architecture using IBM, Stratus, DEC/VAX mainframes, CICS, VSAM RDB/VMS, RMS & local area network; design & develop on-line batch modules networking; modify debug, test & troubleshoot using knowledge of database management systems, ACMS, Cobol C, TDMS, VSE, VOS, FMS on Stratus, data modelling, systems test plan preparation & use of CASE tools $38,000/yr 40 hrs/wk Must have M.S.C.S or equivalent degree & 2 yrs exp in financial software development; must have ability or develop financial software using Cobol, C, TDMS, VOS, Relational Database & VAX mainframes & be proficient in datamodeling using Stratus & CASE tools Submit resume or George Department of Labor, GA #5646660, 2943 North Druid Hills Road Atlanta, GA 30329 or to the nearest Georgia Job Service Center

Computer Analyst. Design & develop custom financial software, including loans collections & associated data applications. 4 yr programming, analyses or engineering exp. in design & support of software for banking or financial institutions. or Bachelor's in Computer Science & 2 yr programming, analyses or engineering exp. in design & support of software for banking or financial institutions. Specific exp. in use of PROBE 4th generation language, design & conversion of financial data & processing systems, writing & testing program modules; and user training & support; development & implementation of maintenance regrams; & creation & maintenance of project documents 40 hrs/wk Mon-Fri $34,000/yr Orlando, FL employer Send resume to Job Service of Florida, 3421 Lawton Road, Orlando, FL 32803-2999 re: Job order number FL-0869454

Development Staff Member (Boca Raton, FL). Conduct performance analysis of the complex multi-tasking operating system OS/2 and graphical video subsystems. Perform software design and implementation in C and Assembler, in addition to memory usage and Page Timing analyses. Engage in complex performance and memory analysis tools design for base operating system and video subsystems. Ph.D in Computer Science plus 1 year in job or 1 year as a Graduate or Post-graduate Research Assistant. The one year experience must include performance of image analyses design and the development of applicable algorithms, together with vision systems and graphical designs development with accompanying algorithms. 40 hrs/wk; 8:00 a.m. - 12:42 p.m., $55,000/yr Applicants should submit resume to the Job Service of Florida, 2890 W. Oakland Park Boulevard, Fort Lauderdale, Florida 33111-1347. Reference Job Order #FL-0893594

Senior Data Analyst: Design & develop databases & data dictionaries for analytical tasks for non-profit organization engaged in the evaluation & accreditation of healthcare facilities. Test the logical flow & design programs to calculate clinical indicators. Perform programming & database analysis, utilizing SAS programming language, UNIX AIX operating systems & other tools including database graphics & statistical software & produce periodic aggregate reports regarding content, quality & limitations of indicator databases. Maintain appropriate written documentation for indicator programs, reports, variable formats & labels. Participate in capacity planning for the RS/6000, making recommendations for increased memory, disk space & utilization patterns. Provide PC support & troubleshooting. 35 hrs/wk, 8am to 5pm $35,100/yr. Must have 5 years of college & M.S. degree in M.I.S. or must have completed all academic requirements for M.S. degree. Coursework must include at least 1 course each in: 1) Business Data Processing, 2) Business Systems Analysis Design, 3) Business Decision Support Systems, 4) Business Applications for Database Management Systems AND 5) Business Data Communications. Must have completed 1 major project each in: 1) Database design management using dBase IV involving tracking & querying of collected data, AND 2) Social sciences research involving data management & analytical tasks related or summary statistical reports using SAS. Must have 1 year experience in the job offered or as Computer Consultant. Experience must include database graphics & statistical software (SAS/graph, SAS/qc, SAS/ftsp) in a networked PC environment & experience in a UNIX AIX operating system environment. Must have proof of legal authority to work permanently in the U.S. Send resume to: Illinois Department of Employment Security 401 South State Street - 3 South, Chicago, IL 60605, Attn: Joan Sykstus, Ref # V-IL-10734-S. NO CALLS. AN EMPLOYER PAID AD - SEND 2 COPIES OF RESUME

SENIOR ENGINEER

Software Systems-Data Base Group Conceptualize, design, code, test and integrate data base software in support of real-time distributed data base. Develop detailed specifications and integrate these into a computer-based energy management system for electronic utilities. Data base system incorporates object-oriented and relational data modelling using an X-Window based graphical user interface. Develop solutions to problems of high complexity. Requires B.S. in Electrical Engineering or Computer Science plus two years' experience as a Software Engineer, or M.S. in Electrical Engineering or Computer Science and no experience. The stated degree/experience must include completion of graduate course or two years' experience in C, UNIX, object-oriented data modeling, relational data modelling, distributed data base concepts and X-Windows application programming. Prevailing working conditions offered. Salary $38,900 per year 40 hours per week. Qualified applicants should send their resumes to: Attn: Order #FL-0898299 Mr. Phil Berit, Job Service of Florida, 3421 Lawton Road, Orlando, Florida 32803. EOE

ACADEMIC PROJECT CONSULTANT (ENG. & SYSTEMS). Academic Project Consultant (Eng. & Systems) wanted by University in Nashville, Tennessee. Prospective employee for University's Computer Systems Department will assist Science Faculty with proof of engineering and mathematical theorems through creation of original software. Additionally, he/she will manage and administrate related research systems files and network on DECnet running VAX/VMS, Pathworks, AT&T, and UNIX workstations. Employee will maintain maintenance and modify Bitnet, TECnet, Internet communication systems linking various departments to a central computer, and automating system operations using DCL, Shell utilities. Experience: No experience required. Education: B.Sc. (Engineering, Physics or Applied Mathematics), M.Sc. (Computer Science), University Course in Algebraic & Symbolic Manipulations. Salary: $28,600/year Hours: 37.5/week Job No: TN1402994 Qualified applicants send resume to: Kathy Main, Job Serv. Prog. & Techn. Support, Tenn. Dept. of Employment Security, Nashville, Tenn. 37245-1200.

ACQUISITIONS

BRANSON & TULLY

CONSULTING / PERMANENT

Nationwide Opportunities for Fortune 1000's. If you are skilled with any of the following you may qualify:

- Nat/Adabas-Financial or MRP Mgrs, Sr P/A. DBA, CSP Sys
- DBS E Series (MSA) HRMS, PR, GL, IE, EMR, MARS-G & others
- DBS M Series (MAD) HR/PR, AR/AP, GL, SDT, PDL, Millenium

* AS400/RPG400, Unix/C, P/A's, LAN, Gui ORACLE/Sybase/Client-Serv, VisualBasic, COBOL, CICS, DB2, IMSDB/DC, ADW, IEF, HBO Medipac, SMS, PeopleSoft, Tesseract, Genesys & American Software

For immediate consideration call

Virginia Smith
EN-DATA CORPORATION
200 E. 3rd St., Ste. 204
Sanford, FL 32771
PH (407) 323-9033
FAX (407) 323-9088

Nationwide
SOFTWARE SALES SUPPORT Opportunities 40K - 70+K

Immediate coast-to-coast opportunities in Pre/Post Sales Support & Consulting for individuals with excellent presentation/communication skills and solid technical background in one or more of the following:

- 4GLS, Client/Server Tools
- AI Development Tools
- C, C++, OOPS, GUI
- UNIX, RDBMS (SYBASE)
- MVS, DB2, Tool/Debug Tools
- Applications Software

Send/fax resume to:

NETWORK RESOURCES
420 Lake Cook Rd
Suite 114
Deerfield, IL 60015
Fax: (708) 948-0043

DESIGN ENGINEER required. Research & development of engineering design tools using graphics software & graphical user interface in CAD system including work with 2D & 3D graphics, hidden line removal, render & shading algorithms, geometric modeling & object oriented programming techniques. Systems & languages used: UNIX, C, C++, XI Intrinsics, & OSF/Motif. Masters Degree or its equivalent required. Computers or Engineering, plus 1 year experience in the job offered. Must have proof of legal authority to work in the U.S. Salary -- $38,000/year for a 40-hour work week. Interested applicants contact the Oklahoma Employment Security Commission, 11654A East 21st St., Tulsa, OK 74129 (ID #7209). Phone: (918) 437-0844. Refer to job order number 068848. Ad paid by an Equal Employment Opportunity employer.

Systems Analyst to design, develop, test and document an integrated computer warehouse management system using INFORMIX/C and FOURGEN CASE tool in UNIX environment. Porting some modules from NCR mainframe to UNIX environment. Analysis of user requirements using structured systems methodologies. Software development and enhancements using UNIX, INFORMIX-4GL, INGRES-4GL, ESQL/C, SQL, Shell programming, C, CURSES and AWK. Require: M.S in Computer Science or Computer Engineering/Information Systems with two years experience in the above described job duties. Salary: $35,000/year. Apply with resume to: Georgia Department of Labor, Job Order #GA 5647960, 2943 North Druid Hills Road, Atlanta, GA 30329 or to the nearest Georgia Job Service Center.

IMMEDIATE

Contract & Perm Jobs: 30 Positions

- UNIX, C, C++
- Sybase
- X-Windows
- Motif
- TCP/IP

PROTECH SYSTEMS GROUP, INC.
Attn: Dept. HRCW-13
5545 Murray Road, Suite 300
Memphis, TN 38119
800/459-5100
FAX 901/767/9350

COMPUTER CONSULTANTS SAUDI ARABIA

AL-KHALEEJ COMPUTERS, a large & reputable computer company in Saudi Arabia has opportunities in the following fields of expertise

EDI Consultants * experience with the ANSI x12 Standard & EDI FACT Standard

IMAGING SYSTEMS Consultants * with 5+ years experience with FILENET

CASE Consultants * with 5 years experience with ADW (Knowledge Ware) Case Tools coupled with IMS DB2, Cobol 2

FORESIGHT METHODOLOGY Consultants * with 10 years general experience in development of business systems in a large M/F environment

SYSTEMS ANALYSTS * with at least 5 years experience with IMS, DB2, Telon, Cobol 2

SYSTEMS PROGRAMMER * to support IMS & DB2

Other Specialists will be required with solid experience in any of the following products: XDB, CD-Rom base computer select, Workflow System, E-Mail, Unix/AIX, Access, Foxbase, Oracle (DB & Analysis)

We offer 1 year (renewable) contract with excellent TAX FREE salaries & benefits Int'l transport, free housing, medical insurance, local transport allowance, paid vacation leave. Please send or fax your resume with a detailed skills matrix to:

AL-KHALEEJ COMPUTERS - HRD
c/o Informatique Com-Tel
105 Abraham-Martin, Suite 600
C.P. 2113, Quebec G1K 7M9 - Canada
Fax: (418) 694-9679

This space for hire.

Call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700). And recruit the best with *Computerworld*.



Weekly. Regional. National. And it works.

An IDG Communications Publication

Midwest

We Know No Boundaries. Neither Should You.

At AiC, we know no boundaries. And neither do our employees. Which is why we have grown to become one of the nation's leading providers of software services. Last year, we topped the $159 million mark in sales. To help us continue to grow, we're looking to add to our highly capable staff. So, if you want a position where you can advance your technical skills through training and hands-on learning in a broad range of industries, set your sights high. Set them on AiC.

PROGRAMMER ANALYSTS

Excellent opportunities available now for professionals with experience in any of the following skills:

COBOL, CICS, DB2, ORACLE
SYBASE, INFORMIX, INGRES, C, UNIX
APS, GUI, POWERBUILDER, VISUALBASIC

Qualified candidates should have three or more years experience with analysis, design, coding and implementation of application software.

For a rewarding career with a company that offers a constantly stimulating environment as well as a full range of benefits, including paid overtime, please send your resume, in confidence, to the AiC Technical Recruiter at the location you are interested in:

Chicago
1101 Perimeter Drive
Suite 500
Schaumburg, IL 60173
(708) 619-4673

Cincinnati
8044 Montgomery Road
Suite 700
Cincinnati, OH 45236
(513) 792-2730

Indianapolis
7340 Shadeland Station
Suite 100
Indianapolis, IN 46256
(317) 842-1100

Columbus
471 East Broad Street
Suite 200
Columbus, OH 43215
(614) 224-6790

Detroit
3000 Town Center
Suite 570
Southfield, MI 48075
(313) 353-7230

AiC is an Equal Opportunity Employer

Southeast/Southwest High Tech

Career Fairs

Information Systems • Telecommunications • Engineering

Atlanta/Southeast High Tech
AGS Information Services
AIC
American Software, USA
Atlanta Group Systems, Inc.
Bell South
Blue Cross & Blue Shield of Tennessee
CAP GEMINI AMERICA
C.P.I.
Computer Horizon
COMSYS Technical Services
Consulnet
Crawford & Co.
Cutler/Williams
DCA
DRACS
DRT Systems International
Equifax
Federal Reserve Bank
Hays Microcomputer Products
HBOC
Howard Systems International
KEANE, Inc.
Life of Georgia
Lockheed Aeronautical
Metro Computer Services
NationsBank
Software Service Corporation
Systemware
TeleTech
Texas Workers' Compensation Insurance Fund
Total Systems Services
Trecom
TRIAD Data
TSG
The Windsor Group
T.M. Floyd

Dallas/Southwest High Tech
AGS Information Services
Alcatel Network Systems, Inc.
American Airlines
Andersen Consulting
BNR
CAP GEMINI AMERICA
Computer People, Inc.
Comsys Technical Services
Corporate Software
Cutler/Williams
CW Systems
DCS
E-System-Garland Div.
E-System-Greenville Div.
Ericsson Radio Systems, Inc.
Ernst & Young
Fidelity Investments
Greyhound
Intervoice, Inc.
JCPenny Information Systems
JCS Consulting
MBNA Information Services
McLane Data Systems
Metro Information Services
Montare International
Nationsbank
Nokia Mobile Phones
Paging Network, Inc.
Perot Systems
Scott & White
Seer Technologies, Inc.
Software Solutions
Sprint
Tandy Technology
Triad Data
VoicePlex Corporation

Sept. 20 - 21

Atlanta
Embassy Suites Perimeter
1030 Crown Pointe Pkwy
11:30-2 and 4-7 Monday and 8-1 Tuesday
Supported by Computerworld
Joint effort by Career Fair Coordinators and Atlanta High Tech

Dallas
Infomart - 1950 Stemmons Frwy
11:30-2 and 4-7 pm
Monday and Tuesday
Supported by
Computerworld and SWHT Co-op

Upcoming Fair in
Tempe/St. Pete - October 4-5
Crown Sterling Suites
Supported by Computerworld and
Sunshine Recruiter Network

EEO Qualified Recruitment Events

If unable to attend, please send your resume to
Career Fair Coordinators - Dept. CW
PO Box 1456 Coppell TX 75019
(Please list which locations you are interested in)

The Leading Technology Fairs for the South

COMPUTER PROGRESS UNITED
$40,000 to $60,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available with a National Client in all regions of the U.S.

VAX/COBOL ■ TELON
IDMS ■ ADS/O ■ C++

Send resume or call:
Computer Progress United
12730 Townepark Way
Louisville, KY 40243
(502) 245-6533

Software Professionals

Exciting career opportunities for programmers, PA's and DBA's in the following areas:

Informix 4GL
Informix ESQL/C
Oracle or Sybase
Smalltalk or C++

National Strategic Resources, Inc

NEW CAREERS

ORACLE Professionals ..... To $54K
IMS PAs ..... To $50K
Columbus, OH • 614-846-6835
or FAX 614-847-5633

RS/400 PAs & SAs ..... To $50K
INFORMIX DBA ..... To $55K
Cincinnati, OH • 513-671-6275
3429-B Springfield Pike, 45215

Multiple openings in all areas
Employers $35-75K+
Lisle, IL • 708-963-6780
4712 Main Street, #200, 60532

National Computer Associates

Systems Analyst. 40 hrs/wk. 8-5. $35,000 yr. Design, develop & support new & existing releases of the UNIS-1100 package using COBOL, DMS-1100 database, TIP environment. SDP UNIS development procedures & support methodologies like TCFS/PCFS. Manage the installation, customer support & enhancements for a forecasting system, an add-on module to the UNIS-1100 package. Manage the LAN gateway to mainframes using Infoconnect software & establish an internal router for PC to UNIX-box communications over the LAN & remote LAN connectivity. Develop Windows-based "front-end" to UNIS-1100 using Infoconnect. Min reqs: Bachelor's (or equivalent) in Mathematics or Computer Science + 1 yr in (a) the design development, documentation, installation & support of the UNIS-1100 manufacturing package using DMS-1100/TIP environment & SDP & (b) the design development & support of a sales analysis forecasting system integrated w/the UNIS-1100 package. Past installation of a gateway to a mainframe using Infoconnect. Apply at the Oklahoma State Employment Service, 11654A E. 21st St., Tulsa, OK 74129 (ID#7209). Job Order #0668673. Must have proof of legal authority to work in the U.S.

Southeast

Computer Consulting Group has immediate openings on its southeast consulting staff for talented Programmer Analysts. We're especially seeking:

- **IMS or CICS or DB-2**
- **APS or CSP**
- **UNISYS MAPPER**
- **TESSERACT**
- **VISUAL BASIC**
- **IMS System Programmer**

Computer Consulting Group
Contract Professional Services

4109 Wake Forest Rd
Suite 207
Raleigh NC 27609
1-800-222-1273
FAX (803)738-9123
Member NACCB

Senior Analyst/Programmer required to define, design, develop, program, test, implement and maintain efficient, economical business computer and noncomputer systems and information services individually or as part of a team analyze requests for new computer systems and corporate problem areas; study new computer development and revise existing system. Analyze and evaluate computer applications to recommend a design or solution to user needs. Perform all aspects of programming, conduct training sessions and prepare complete user documentation manuals. Maintain an awareness of new systems and programming techniques. Contact with user departments and outside hardware vendors - consultant firms. Develop data acquisition form process monitoring systems so as to provide current status of production. Requires: Bachelor's degree in Computer Science and 2 years experience as a systems analyst or programmer. Requires experience with DEC, VAX/VMS and VAX/ULTRIX equipment and applications. Oracles database and Oracles SQL-Loader, and Fortran-77 experience in training staff and preparing user manuals. 40 hrs/wk, 8:00a-5:00p, salary $41,500/yr. Applicants must have proof of legal authority to work in the U.S. Send resume to 7310 Woodward Ave., Room 415, Detroit, Michigan 48202. Reference No. 73793. Employer paid Ad.

SOFTWARE ENGINEER - To analyze complex systems requirements, design and develop Manufacturing, MRP, production Order Processing, and Financial Accounting Systems on VAX/VMS using VAX, INGRESS, COBOL, C, ABF, 4GL, DTR, TDMS and ORACLE and Yourdon methodology for systems analysis and design. Req'd: BS in Computer or Chemical Engineering or Computer Information Systems or any engineering degree, 18 mos. exp. in the job offered or 18 mos. exp. in related occupation as Software Consultant or Analyst Programmer. Requires at least six mos. exp. on HP-9000, developing application under client server environment using Unix, C, ESQL, X-WINDOW tool kit, and Motif. Also req'd exp. in using case tools CEW, SSAD methodology and user training. 40 hrs/wk, 8:00 a.m. - 5:00 p.m., $42,000/year. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref # 57993. "Employer Paid Ad"

FREE Bulletin Board

DP/MIS/IS Career Opportunities
Clients Companies pay ALL FEES
OVER 600 NATIONAL LISTINGS
Description of Jobs available
for Download PLUS other useful
files. DIRECT DIAL 24 HRS/DAY.

813-495-1801 (8-N-1)
JACK DETURK
DP/MIS CONSULTANT
DP JOB WORKS
13431 BRIDGEFORD AVE
BONITA SPRINGS, FL 33923
TEL. 813-495-9005
FAX/BBS 813-495-1801
COMPUSERVE 70744,3545
American Online DPJOBWORKS

Call, Write OR Fax In Confidence

IS PROFESSIONALS

Opportunities abound in the Southeast for talented, experienced (3 years minimum) Programmers, Senior PA's and DBA's. Join our talented staff and work in state-of-the-art environments on challenging projects.

- DB2, CICS, COBOL II
- APS, CICS, SQL
- PL/1, IMS DB/DC
- COBOL II, IMS DB/DC
- Easytrieve+
- Gentran, Acucobol
- VAX, Fortran, Ingres
- 4GL, ABF
- Powerbuilder, Sybase
- UNIX Systems Administrator
- IDMS, ADS/O, CICS
- ORACLE, ORACLE TOOLS
- PL/1, COBOL II IMS, DB2

We offer excellent compensation, relocation assistance, full benefit package and education reimbursement. Send your resume TODAY!

AMERICAN COMPUTER PROFESSIONALS
140 Stoneridge Drive
Suite 350
Columbia, SC 29210
800-933-9227
Fax: 803-779-1955
Equal Opportunity Employer



JOIN OUR HIGH-TECH TEAM AND BUILD A FUTURE THAT'S AS BRIGHT AS OUR SUNNY SKIES!

When it comes to sophistication in operating systems, application techniques and exploration of new approaches, no organization can match Barnett Technologies, the dynamic MIS affiliate of Barnett Banks, Inc. You'll want to be part of our team as we take on diverse challenges in support of the tremendous growth at Barnett®, Florida's undisputed banking leader with $38-billion in assets.

As a Systems Development Team Leader at our Jacksonville location, you will be involved with the management of technical resources, along with the support and enhancements of our day-to-day production systems, including management and development of staff and compliance with all budgetary, reporting and P.M. guidelines and standards. Extensive experience with M&I Deposit Systems is preferred, along with 5 years project management experience. Technical knowledge of M&I deposit software, IRS experience with DISC software and 3-5 years technical team management experience in support of M&I Deposit Systems are preferred. DB2 and COBOL II experience a plus.

Our team members enjoy highly competitive compensation and performance-based growth potential. As a recognized industry leader in providing progressive work/family programs tailored to our employees' needs, we also offer a generous flexible benefits plan. You can truly have the best professional and personal advantages by joining our team in Florida! For consideration, please call Paul Lowrance at (904) 464-4988 or send your resume to: Barnett Banks, Inc., Professional Recruitment/FL-3020, P.O. Box 44147, Jacksonville, FL 32231-4147. FAX: (904) 464-2424. An equal opportunity/affirmative action employer. BARNETT SUPPORTS A DRUG FREE WORK ENVIRONMENT. "Barnett is a registered trademark of Barnett Banks, Inc."

Barnett Bank **Barnett Technologies, Inc.**

Unequalled Opportunities
FOR UNLIMITED SUCCESS

Midwest

CLIENT/SERVER DEVELOPMENT

We are looking for developers experienced with relational technology to play a critical role in building new systems.

Project Leaders
Database Administrators
LAN Administrators
Programmer/Analysts
Programmers

We are a growing company, headquartered in the western suburbs of Chicago, with a commitment to putting information technology to work in our operation.

Several large projects are underway which will reengineer our custom systems for a new era of networked computing. Our Systems Department is writing applications using:

CICS and DB2
Powerbuilder and Visual Basic

If you have a record of superior academic and professional achievement and are highly motivated, forward a letter and resume to:

McMASTER-CARR
supply company
Personnel/Comp.
P.O. Box 4355
Chicago, IL 60680-4355
Equal Opportunity Employer

WE'RE HIRING IN COLUMBUS, OH AND PITTSBURGH, PA

EXPERIENCED PROGRAMMER/ANALYSTS

We have immediate openings both within our organization and permanently at our large client base. We offer one of the best benefits packages available and salaries to Mid $50's. Please call, fax or mail your resume to us ASAP. We desire:

ORACLE, SQL, C, UNIX, SYBASE, INFORMIX, VAX, RDB, HP, SUN, CSP, APS, HOGAN, NATURAL COBOL, IMS DB/DC, DB2, CICS, FOCUS, RAMIS AS/400, BANYON, NOVELL, TCP/IP, TOS, EDI MOTIF, WINDOWS, OOP, GUI, OS/2, POWERBUILDER

COMPUTERPEOPLE, INC.

Our Clients Consult With the Best...

...GILCOR ENTERPRISES, INC. and *you!* Headquartered in Chicago, we are a nationwide consulting firm with upcoming projects in the Midwest and Atlanta areas. We are looking for Technical and Analytical Consultants on a per project basis. Qualified candidates will have senior level experience in one or more of the following areas:

- UNIX, C, C++
- JAD/RAD
- DB2 DBA
- ORACLE DBA
- Data Administration
- Client/Server: OS/2, WINDOWS
- IMS DB/DC and TELON
- Process Improvement Analysts
- MVS, MCP/VTAM Systems Programmers

Willingness to travel preferred.

Please mail or fax your resume with salary history (principals only, please) to:

GILCOR ENTERPRISES, INC.
Attn: Ms. Judy Reinhardt
17W220 22nd Street, Suite 510,
Oakbrook Terrace, IL 60181-4477 Fax: (708) 953-0388
Equal Opportunity Employer

Cooper Communities Inc. the nation's leading builder of planned recreational communities has an immediate opening for an applications programmer.

To qualify, candidates must possess technical knowledge and experience in IDEAL or PL-1 CICS, and VSE JCL. Must be strong in either PL/1 or IDEAL. Currently running in a PL/1 and VSAM environment but moving to IDEAL and DATACOM; minimum of two years experience in PL/1 or IDEAL.

We offer an outstanding work environment with rewards and recognition based on work performance, competitive compensation and benefits. Qualified candidates who desire to relocate to a scenic area of Arkansas may forward their resumes in confidence to:

Cooper Communities
Human Resources
Cooper Communities, Inc.
1901 Forest Hills Blvd.
Bella Vista, AR 72714-2399

INFORMATION SYSTEMS OPPORTUNITIES

SYBASE
ORACLE
CICS/DB2
WALKER
MEDIPAC
HOGAN
COBOL MVS/VSE
IMS DB/DC
RPG III
SAS

These & other I.S. opportunities currently exist at all levels in the Pittsburgh, PA, Atlanta, GA, and Washington, DC areas due to our tremendous growth in these markets. Join a dynamic company on the leading edge in technology and watch your career soar. To explore how you may take advantage of a challenging and rewarding opportunity, call or fax a current resume to:

PBC, INC.
311 7th Avenue
Suite 1401A
Pittsburgh,PA 15219
phone 800-722-9820
412-391-0714
fax: 412-391-0478

SYSTEMS ANALYST (REF # 58983) to consult with clients to ascertain & define their business reqs. or problem areas & utilize tech expertise to provide solutions to clients needs incl analyzing designing developing & implementing comp s/ware for clients EDP sys. Duties incl analysis, design development & quality assurance of an insurance sys. Responsibilities incl process flow & data flow design.; data modeling identification, tech support & meetings with users to gather reqs; quality assurance & implementation of the sys. & user training using IBM 3090 under MVS/ESA, IBM PS2, TSO, COBOL, CICS, DB2, JCL, OMF & SPUFI. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req ed & exp. REL EXP: in whole or in part, development of application sys incl insurance sys. & using IBM 3090, PS2, MVS/ESA, TSO, COBOL, CICS, DB2, OMF & SPUFI. $34,000/yr 40 hr/wk. Please send resumes to 7310 Woodward Ave., Rm 415, Detroit MI 48202 & include Ref # Employer Paid Ad

COMPUTER SYSTEMS Design computer systems, including system requirements, layout & procedures. Develop new system specifications and flow charts. Analyzes and assists in implementation of new systems. Design, develop, write and debug custom applications softwre as per needs of customers. Systems to be designed for North American and Asia exports markets and may include custom configurations, distributed processing, various device drivers, and ability to generate two-byte Oriental Characters, such as Kanji or Mandarin Characters. Computer languages and software used includes Fortran, "C" and relational databases. Bachelor's degree in Computer Science required. Must have two years experience as a computer systems analyst. Experience must include use of: Fortran & "C" computer languages, a programmable relational database application; and computer programming which includes writing device drivers and general of two-byte Oriental Characters by printer. Hours: 9 am to 5 pm, 40 hours per week. Yearly salary: $35,250. Must have proof of legal authority to work permanently in the U.S. Send two resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street-3 South, Chicago, Illinois 60605, Attention: JACK LEN BOKSA Reference #V-IL 10799-B. NO CALLS. AN EMPLOYER PAID AD - SEND 2 COPIES OF RESUME.

STANDARDS ADMINISTRATOR -To develop Multimedia Applications using James Martin's IE-EXPERT, DOC-TO-HELP and Oracle Book. Develop Standards for application development in Oracle Version (6.0), Oracle Version (7.0), SQL FORMS 3.0, Oracle CASE 5.0, Report Writer 2.0, SQL MENU 5.0, SQL PLUS 3.0, PRO-C, SQR, C++ and Oracle Data Browser. Install, evaluate and maintain software on Local Area Network and on UNIX hardware. Perform Systems and Database Administration functions. Req'd: B.S. in Computer Science, 3 yrs. exp. in the job offered or 3 yrs. exp. in related occupation as Programmer Analyst. Academic background must include one course each in: Data Base Systems, Object Oriented Methodology, Advanced Software Engineering, Distributed Systems. Exp must include programming in ORACLE, SQL*FORMS, SQL*MENU, James Martin IE and CASE. 40 hrs/wk, 9:00 a.m - 5:00 p.m., $52,000/year. Send resumes to: 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref # 73593. Employer Paid Ad.

Systems Analyst, 40 hrs/wk, 8-5, $34,000/yr. Design, develop & support new & existing releases of the UNIS-1100 package using DMS-1100 database, TP environment, SDP, COBOL and UNIS development propedures & support methodologies including TCF/UPDFS. Manage the installation, customer support & enhancement for an extended purchasing system (an add-on module to the UNIS-1100 package) using DMS-1100 database, TP environment, SDP & COBOL. Develop enhancements to the shop floor labor management system. Provide development & support for PC/DCS & its interface to shop floor & UNIS-1100. Min reqs: Bachelor's (or equivalent) in Mathematics or another scientific field. 1 yr (ii) design, development, documentation, installation & support of a UNIS-1100 manufacturing package & of a purchasing system in DMS-1100/TIP environment using SDP & (b) Unix administration w/C programming in interfacing hardware devices related to shop floor applications. Apply at the Oklahoma State Employment Service, 11654A 21st St., Tulsa, OK 74129 (ID#7209). Job Order # 068840. Must have proof of legal authority to work in the U.S.

SPSTAFFING SINCE 1984
PERMANENT FL OPPTY'S
DBAs Sybase DB2 ..... $55K
P/As Powerbuilder $60K
S/E Ada C Clips $48K
S/E Oracle X-Windows $42K
P/A BS ED/DCS/KBMS $43K
P/A Frames Unix C $45K
P/As HP/UX Informix C $45K
P/As C DOS Btrieve $43K
Telecom T1 OS/2 LAN $45K
P/A Windows DOS SQL $40K
P/As C++ Windows SDK $45K
P/A's CICS/IMS/DB2 ..... $40K
P/As MVS Cobol M&D $43K
AVAILABILITY, INC.
Dept. C, P.O. Box [illegible]
[illegible]
FAX [illegible]

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you large numbers of professionals who work in your industry.

When you're recruiting computer professionals, it's often important to find ones with experience working on systems specific to your industry. From manufacturing to banking, healthcare to insurance, Computerworld's audience of 629,204 is made up of the right people in every major industry.

Industry	Experienced Professionals in Computerworld's Audience of 629,204 (multiple responses given)
Computer Vendor and Consulting	236,791
Computer Manufacturer	92,524
large-scale computers	58,896
medium-scale computers	43,832
small-scale computers	39,210
personal computers	58,385
technical workstations	27,361
Software Vendor	218,027
for large-scale systems	90,606
for medium-scale systems	68,763
for small-scale systems	58,422
for personal computers	97,695
for technical workstations	33,217
Non-CPU Computer Products Manufacturer	42,051
VAR/Dealer/Retailer	27,772
DP Service Bureau/ Contract DP Services	71,293
Consulting/Planning	76,848
Manufacturer (not computers)	202,131
Insurance	91,117
Healthcare	48,866
Banking/Financial Services	116,696
Government Federal/State/Local	114,677
Business Service (except DP)	63,793
Communications Systems	55,744
Public Utilities	24,931
Transportation	51,533
Wholesale/Retail Trade	107,725
Education	92,761

SOURCE: Skill Survey of Computerworld's Audience, August 1992.

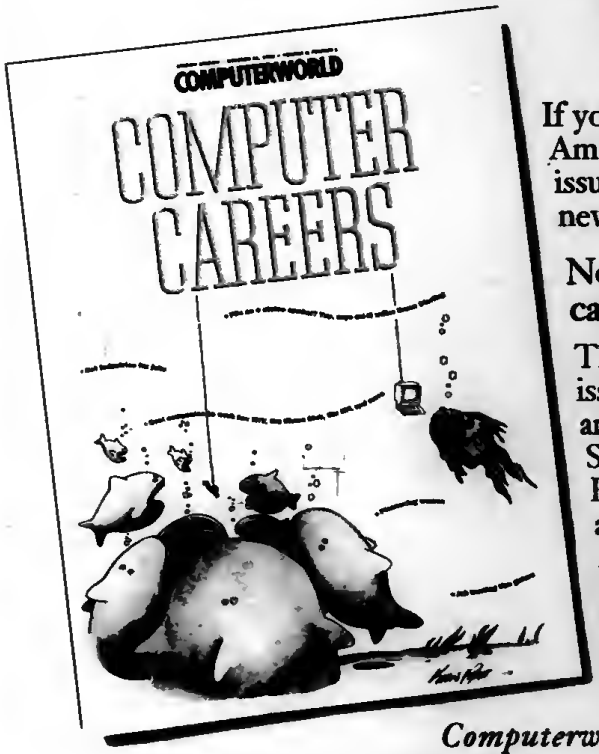
To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

COMPUTERWORLD
Where the qualified candidates look. Every week.

Now you have a better way to recruit university and college students planning computer careers:

Computerworld's sixth annual Campus Recruitment Edition

Issue Date: October 31, 1993
Close: September 17, 1993



If you recruit top computer career students on America's campuses, your message in this special issue will target more of them than any other newspaper or magazine!

Now you can recruit computer talent on campus without leaving your office!

That's because 100,000 copies of this special issue will be distributed to America's best and brightest students enrolled in Information Systems (IS), Computer Science, Computer Engineering, Electrical Engineering, and just about any other computer-related curricula.

Finally you can cost-effectively reach the quality and quantity of students you need!

And you can do it with just one ad in *Computerworld's Campus Recruitment Edition!* For a rate card reflecting complete campus distribution, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700). But hurry ... this issue closes September 17, 1993.

Planned Editorial Features:

(subject to revision)

- Companies where computer career students want to work. And their top choices for: Information Systems, Engineering, Sales & Marketing, Technical Support, Research & Development.
- Information Systems salaries from Computerworld's annual survey with the Association for Systems Management
- And much more!

BDM FEDERAL OFFERS:

TECHNICAL OPPORTUNITIES IN SAUDI ARABIA

BDM Federal, Inc., a premier professional and technical services firm with a growing team in Riyadh, Saudi Arabia, has immediate openings for the following degreed professionals possessing U.S. citizenship:

Network Data Communications Specialist – HP

Requires 15 years data communications experience along with 10 years HP systems and S/W (MPE/XL). Requires 5 years in planning, designing, implementing, and maintaining X.25 switching networks connecting multiple systems (HP/IBM/VAX) and protocols. In-depth knowledge of local/wide area networks using X.25 cloud and with a special emphasis on operating system tuning is desired.

Network Data Communications Specialist – IBM HW/SW

Requires 15 years data communications experience, 10 years with IBM HW/SW and 5 years in planning, designing, implementing, and maintaining X.25 switching networks connecting multiple systems (HP/IBM) and protocols. In-depth knowledge of VTAM, NCP, VTAM TRACES, DATA SCOPES, ANALOG TESTER and NETVIEW COMMANDS is a must. Working knowledge of DSPRINT, NETSOL, NETVIEW, LU 6.2, ASSEMBLER H, SMP/E, CA-1 in an MVS/ESA Version 4.0 or higher environment is also essential. Applicants without IBM HW/SW communications support experience should not apply for this position.

HP IMAGE/ ORACLE Database Administrator

Requires 15 years DB administration experience in an HP environment, a minimum of 6 years with MPE/XL, and 5 years as an ORACLE DB administrator with experience maintaining Version 6.0 or higher in HP and client/server environment. Proven experience in installing, customizing, tuning, and maintaining IMAGE/ORACLE DB S/W is a must. ORACLE CASE experience a plus. Applicants must be capable of participating in all phases of design/development of new systems and maintaining existing systems.

HP IMAGE/ ORACLE Programmer Analysts

Requires 10+ years programming in support of automated supply or maintenance accounting systems and USAF automated supply/maintenance operations. Hands-on experience with HP MPE/XL, HP MPE/V, QUERY, IMAGE, VIEW, POWERHOUSE, CASE tools, 4GLs, ORACLE, COBOL, JCL, PROTOS, ADAGER, QEDIT, and/or SUPERTOOL mandatory. Thorough knowledge of USAF supply/maintenance policies and procedures (particularly FMS programs) desired. ORACLE CASE experience a plus.

IBM Database Administrator

Requires 15 years experience administering DB2 IMS/DC in an MVS environment to include CICS and DB. Strong knowledge of DB2 IMS physical design, utilities, coding techniques, and security structures, as well as knowledge of PLATINUM DBA tools and CASE modeling methodologies are essential.

These are accompanied assignments that include transportation, housing, and liberal benefits. If you qualify and desire a rewarding overseas challenge with a world-class team, send your resume to: BDM Federal, Inc. Dept. CW-9/13, 1501 BDM Way, McLean, VA 22102. An equal opportunity employer. A subsidiary of BDM International.

BDM FEDERAL
A BDM International Company

COMPUTERPEOPLE

Turning Technology Into Power

Immediate professional careers for permanent placement and consulting.

IBM Applications Programmers
CICS/VSAM, IMS DB/DC, IDMS/ADSO, Pacbase, Powerbuilder, Oracle, IEF, IEW, ADW, and AS400

TANDEM
Cobol/Scobol/Pathway, TAL, C/UNIX/SQL

Client Server
C/UNIX, X Windows/GUI, OS2/Windows, C++/Sybase, Oracle

Turn to Florida's Leader
Computerpeople, Dept. 531

Orlando Area
201 S. Orange Ave., Suite 1020 • Orlando, FL 32801
800-299-9955 • FAX 407-843-8155

Jacksonville Area
9116 Cypress Green Dr • Jacksonville, FL 32256
800-700-3945 • FAX 904-737-7369

Ft. Lauderdale Area
3265 Meridian Pkwy., Suite 122 • Ft. Lauderdale FL 33331
800-777-8605 • FAX 305-389-0204

Tampa Bay Area
12225 28th Street North, Suite A • St. Petersburg, FL 33716
800-329-2626 • FAX 813-572-1153

Software Developers

Software Services Corporation, located in Ann Arbor, Michigan, is a full service computer consulting firm specializing in custom software development. We are currently seeking skilled and resourceful specialists who are ready to help our clients meet their exceptional requirements.

If you have experience in any of the following areas, our talented and innovative team would like to talk with you.

Object Oriented Specialist
Smalltalk, 80, C++, OOBMS, Versant or Gemstone preferred

Microelectronics Careers
Real-time Embedded Systems
Data Acquisition/Test Systems
Multiplexed Microprocessor Systems
Device Driver Software Development
Automotive Electronics

RDMS
Informix, Oracle or Sybase with 4GL

Software Developers
Unix and C with CAD/CAM CAE, X Windows, Motif

Software Services offers outstanding salaries, benefits and career challenges. Fax or mail your resume (in complete confidence) to:

Software Services Corporation
Software Services Corporation
2850 S. Industrial Hwy, Ste 300
Ann Arbor, MI 48104
(313) 971-2300 or 800-448-1568
FAX (313) 677-0230 (E.O.E.)

ORACLE® • SYBASE®
CONSULTANTS & TRAINERS
EXPANSION OPPORTUNITIES

MIACO is gaining national and international recognition leading the Fortune 500 to success with RDBMS. We have current regional opportunities for professionals with 5+ years experience in applications development and current expertise in Oracle or Sybase. Bachelor's Degree and willingness to travel required. EOE.

Fax or send resumes: ATTENTION CW1

MIACO® corporation

Western Division
6300 S. Syracuse Way
#415
Englewood, CO 80111
Fax (303) 741-5901
Phone (303) 741-0381

Eastern Division
8201 Corporate Drive
#200
Landover, MD 20785
Fax (301) 731-8645
Phone (301) 731-8640

info@miaco.com

This Space for HIRE! CALL:

800-343-6474

in MA., 508-879-0700, ask for John Corrigan, Vice President Classified Advertising.

COMPUTERWORLD

Weekly. Regional. National.

And it Works!

TANDEM
COBOL, PATHWAY, TAL, SCOBOL, C, SQL, X.25

STRATUS
PL1, COBOL, C, DN/2

MUMPS
DSM, ISM, MSM, GTM, IBM RISC/6000. Powerbuilder Fulltime/Consulting Positions available in the US/ASPOAD

STRATEM

800-882-JOBS
TEL (212)867-2910
FAX (212)867-4205
124 W. 30th St. Suite #302
New York, N.Y 10001

Sunbelt Opportunities

ADW/IDD Prog/Anal's 30-40K
IDB Prog/Anal's 30-40K
MAPICS Prog/Anal's 30-40K
TANDEM Prog/Anal's 30-40K
UNIFACE Prog/Anal's 30-40K
ORACLE Prog/Anal's 30-40K
ORACLE DBA's 40-50K
SYBASE Prog/Anal's 30-40K
MED/CICS Prog/Anal's 30-40K
IMS DB/DC Prog/Anal's 30-37K
HOGAN Prog/Anal's 30-40K
EDP Auditors 30-40K

SUNBELT RECRUITERS
2225-107 E. Flamingo Road
Las Vegas, NV 89119 • (702) 369-9886
Attn: Rick Young, C.P.C.

Programmer/Analysts Business Analysts

Immediate placement with large financial institutions looking for the following skills:

APS - Commercial
Mapics - TRA/DRA/CRS
Oracle - Consumer
Unisys - GVL

Full time employers & contract positions available. Send resume, current compensation & day & evening phone nos. with best time to contact you.

Microquity & Company Inc.
12120 Old Tesson Road, Suite #100
St. Louis, MO 63141
or Fax: 314-878-8884

Over 629,000 computer professionals read Computerworld weekly.

EXCELLENCE IN SOFTWARE CONSULTING

We're the Registry, a dynamic, rapidly growing software consulting company dedicated to excellence. Our solid reputation is built on our commitment to understand and meet the needs of our clients and consultants, and to provide superior service to both on a day-to-day basis.

National Contact: Dan (800) 248-9119 FAX (617) 527-8805
ORACLE/FORMS 3.0 • C/RDB/DEC-FORMS • MUMPS • VISUAL BASIC • ORACLE DBA • UNIX KERNAL/NFS • IDMS/ADSO

Atlanta, GA Contact: Jeff (800) 255-9119 FAX (404) 257-0566
MS C++/MS-WINDOWS • ORACLE/FINANCIALS/SQL • SYBASE/INGRES/FOXPRO • C/UNIX/DOS • IMS/DB2/CICS

Boston, MA Contact: Kevin (800) 248-9119 FAX (617) 527-8805
DB2/TELON-MULTIPLE • IBM/CICS/DB2 • IBM/COBOL/SAS • SYBASE/SQR • ORACLE/UNIX/PARADOX • MS-WINDOWS/C++

Chicago, IL Contact: Bill (800) 677-9119 FAX (312) 558-1388
TECHNICAL WRITERS • AS400 ASI/COBOL • UNIX ADMIN/C/SAS • OBJECTIVE C/NEXT • ADABASE/NATURAL • UNIFACE/ORACLE

Cleveland, OH Contact: Ed (216) 328-9900 FAX (216) 328-9338
EXPERT SYSTEMS • IEF/IEW//ADW • ORACLE • MICROFOCUS COBOL/UNIX • POWERBUILDER • MODEL 204

Dallas, TX Contact: Chris (800) 456-9119 FAX (214)497-9053
C++ NETWORK SWITCHING • UNIX/SUN SYSTEM ADMIN • DATA MODELER-ORACLE/DB2 • C++/UNIX/WINDOWS • C++/OOD/OOP/OOT

Durham, NC Contact: Lori (800) 338-9119 FAX (919) 544-9668
SQL WINDOWS/ORACLE • MMS/CMS/DCL • UMS/OSI/STANDARDS • UNIX/C++/X MOTIF • SS7 • ONIX • POWERBUILDER • INFORMIX

New York, NY Contact: Sue (800) 544-9149 FAX (914) 937-3314
EASEL • POWERBUILDER • DATA MODELER/IEF • ACMS/RDB • HOGAN • ORACLE • MS-WINDOWS/SDK

Richmond, VA Contact: Skip (800) 220-9119 FAX (804) 346-0510
DB2/APS(10) • COBOL/DOS • NATURAL • DB2/CICS • IMS DB/DC • SAP/ABAP • IMS DBA • HYPERCARD • VISUAL BASIC

San Francisco, CA Contact: Mike (800) 248-9119 FAX (617) 527-8805
ORACLE/FORMS 3.0 • MS-WINDOWS 3.1/SDK • OS-2/PM/C • SUN/SVR4/PORTING/SOLARIS • MOTIF/X-WINDOWS

South Florida Contact: Tony (305) 779-1500 FAX (305) 728-3457
POWERBUILDER • SYBASE • C++ • VISUAL BASIC • ADW • OCS/DB2 • AS400/RPG OR COBOL

Washington, DC Contact: Kris (800) 387-9119 FAX (703) 790-8467
SEQUEST OPERATORS • ORACLE DBA • BUS. RE-ENGINEER • IEF • SYBASE DBA • ORACLE V5. 6. 7

Find out what it's like to consult with a company that's building long-term relationships based on quality, strength, integrity and vision.

The Registry
189 Wells Avenue, Newton, MA 02159
(617) 527-9119 FAX: (617) 527-8805

Member NACCB An Affirmative Action • Equal Opportunity Employer

The Registry

Systems Analyst (Greenville, South Carolina): Using knowledge of systems analysis, programming methods and procedures, insurance claim payment systems, and commission payment systems and billing systems, design, specify, program and implement new and modified computer systems to process insurance lines of business, and investigate, identify and define user problems. Determine feasibility of installation and formulate proposals reflecting user requirements, function specifications, plans and strategies. Interact with user management on system project approval, design program specifications and documents. Oversee program coding and systems coordination, unit and parallel testing. Formulate implementation plans, and create or modify programs according to design specifications. Install computer hardware and peripherals, and consult with vendors regarding new hardware and software. 40 hours/week, 9am-5pm, $43,000/year. Requires Bachelor's degree in Computer Science or Data Processing, 2 years experience in the job offered or 2 years experience as a Senior Programmer Analyst. Must have demonstrated knowledge of MS/PC DOS, OS/2 v1.3 and CICS, Presentation Manager, Common Shell, Micro Easel and IBM SAA/CUA. Must have two years experience in programming for insurance claim payment, billing and commission payment systems. Send resumes in duplicate to: Greenville Job Service, JO #2000130 705 Pendleton St - PO Box 328 Greenville, SC 29602 No Fee Charged.

Where People and Technology Advance Together

...Sciences ...business consulting and ...services organization ...system integration. Currently, we ... the following positions available ...

Client Server Architects
Minimum 7+ years' experience in full life cycle architecture development/design of distributed technologies including UNIX, OS/2, AIX and Windows. Experience with PowerBuilder, SQL Windows, Access, ObjectVision, Visual Basic, SQL Server, Sybase, Oracle, Informix and Ingres required. Exposure to C++, Smalltalk and any object-oriented methodologies is a plus.

Data Architects
Requires experience with data modeling, logical data and physical database design, requirements definition, workshop facilitation and development of large database architectures containing 20-50 million tables and 50-100 gigabits of data. Proficiency with high volume batch architectures, case tools, capacity planning, database tuning and hardware resources. Working knowledge of relational ... technology such as Sybase, ... needed.

We offer ... including ... tation, profit ... Please send ..., indicating position ... of interest, to: Henry ..., 1200 U.S. Highway 22, ..., NJ 08807-2043 or FAX ... An Equal Opportunity Employer M/F/D/V.

CSC Partners
A Unit of Computer Sciences Corporation

Atlanta Boston Chicago Cincinnati Cleveland Dallas Houston Minneapolis New Jersey New York Philadelphia San Francisco Washington D.C.

JOIN A WORLD LEADER!

Sequent Computer Systems is a leader in mid-to-high-end open computing systems. With expertise in both the UNIX and Windows NT environments, Sequent is on the leading edge of today's enterprise-wide client/server system development. You can be part of the success by joining us now in one of these Professional Services opportunities:

Business Solutions Managers

Dallas Houston Bay Area Boston Chicago WA DC

You will consult with customers to formulate business, organization and information technology strategies. This will include using state-of-the-art management consulting methodologies, business models, organization behavior models and socio-technical organization design to evaluate customer business mission, objectives and requirements. You will analyze and translate results into integrated solutions. In addition, you will have P&L responsibility.

Sr. Business Solutions Architects

Dallas Houston Chicago Bay Area New York Detroit Boston WA DC New Jersey Atlanta Toronto

You will be responsible for the design and development of the largest, most complex and demanding systems solutions to customers' problems. You will integrate hardware, software and the customer in a strategic design process to translate business needs into technical solutions ensuring needs are met.

For both of the above, we are seeking applicants with BS/MS Computer Science or equivalent and 10-12 years' experience in conducting organization/enterprise-wide information technology analysis, solution development and implementation. You must have a documented successful background conceptualizing to delivery of integrated business and information systems solutions to businesses.

Project Managers

Opportunities in cities listed above.

You will be responsible for program/project plan, budget, structure, schedule and staffing ensuring accurate and timely delivery. This will include managing the integration, development and delivery while functioning as the primary representative to customer.

To qualify, you must have BS/MS in Computer Science and 10+ years' providing sales support to integrated software and hardware solutions to customers.

All of the above positions require that you possess the interpersonal and team building skills necessary to develop and manage a team of highly motivated professionals.

Pre-Sales Architects

We also have opportunities for Pre-Sales Architects in major markets across the US. You must be able to interface with executive level IS/IT management on customer-side. You will formulate target solution architectures. Advanced set of consultative selling skills. Must understand new distributed open systems, knowledge at enterprise scale. Minimum 8 years experience.

Beaverton, Oregon Opportunities:

Business Analyst-Information Systems

Experience in business systems and process analysis, design, evaluation, test, focusing specifically on ORACLE Financials.

Marketing Segment Managers

TELCO/Healthcare/Public Sector

Please mail your resume to: Sequent Computer Systems, Inc., Staffing, Dept. PSCW-C, 15450 S.W. Koll Parkway, Beaverton, OR 97006-6063. Fax (503) 578-4560. No phone calls, please. Principals only. An equal opportunity employer.

SEQUENT

Our Business Is Your Success

Tandem™ Programmer Analysts

Step up your career.

Move into the world of consulting.

Internet is a global provider of international banking systems, with over 12 years industry experience. Due to rapid growth and unprecedented demand for our services in the Americas, Internet is seeking Programmer Analysts with at least two years' Tandem™ Systems experience, preferably with financial applications.

Committed to the long-term success of our customers, we need dedicated, qualified professionals to be part of a professional implementation team, providing on-site support in North & South America.

Selected professionals will be based out of Internet's Corporate Headquarters in Chicago. Compensation is excellent and benefits complete. If you're interested in a challenging assignment in a fast-paced and rapidly evolving industry call: (312)540-7374, or mail/fax resume to:
Employee Services,
Internet Systems Corporation,
Two Prudential Plaza, 42nd Floor,
Chicago, Illinois 60601,
Fax (312)540-7444.
eoe m/f/d/v

INTERNET

Systems for Financial Strategies

Microsoft Windows Programmer

Innovative Emergency Management, Inc.
IEM is a high bandwidth, research-based consulting firm located in Baton Rouge, Louisiana. We are seeking to employ a Programmer/Analyst to provide expertise on current and future projects.

Required Experience
- Microsoft Windows
- Borland C++
- Visual C++

Salary
Commensurate with qualifications

Responses
For immediate consideration, please forward resume, statement of salary requirements, and a complete transcript to:

Amy Groves
Attn: Analysis Group, Job #22
Innovative Emergency Management
7423 Picardy Ave., Suite E
Baton Rouge, LA 70808
FAX: (504) 767-8122
INTERNET: Groves @ zeus.ieminc.com

Qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin

IEM INNOVATIVE EMERGENCY MANAGEMENT

Engineer, Sr. Software: Resp. for rsrch, devel, & implementation of software algorithms for FPGA placement & routing for IC design. Duties incl: Implementation of graph-based maze-router, resource allocator to assure optimal designs; implementation & evaluation of placement algorithms. Reqs. Ph.D in CS or EE. Also reqs. doc. rsrch exp. & record of publications or other contributions in design, devel., & implementation of CAD algorithms for layout synthesis, partitioning, placement, & routing; also reqs research background & knowl. of VLSI design & use of CAD tools for VLSI design; knowl of circuit & timing simulation; graph theory, algorithms & data structures; semi-conductor devices; rsrch background in definition, design, implementation & maintenance of large software systems in C/UNIX. Salary: $5,208.65/mo. Job Site/Intrvw site San Jose, CA. Send ad w/ resume to Pam Najera, Human Resources, 2100 Logic Drive, San Jose, CA 95124. Must have legal right to work.

CONSULTANTS

AiC has over 35 locations servicing our Fortune 500 clients, with openings in a wide range of technologies. We offer a competitive compensation package on either a project or salaried basis with comprehensive benefits for individuals with 2+ years professional experience. EOE. Send or fax your resume:

Analysts International Corp.
P.O. Box 39012
Minneapolis, MN 55439
Fax (612) 897-4544

★ APPLICATION ★ ALL STARS ★

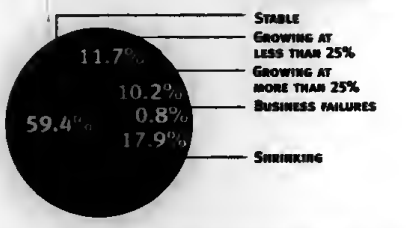
ASSIGNMENTS NATIONWIDE USING
★ PEOPLESOFT ★ MARCAM
★ JDE ★ MAPICS ★ DBS
★ ASK ★ BPCS ★ CA ★ ISI
★ CYBORG ★ SW/2000 ★ SAP

EXCEL PARTNERS INC.
481 Chestnut Ridge Rd. Suite 208
Woodcliff Lake, N.J. 07675
(201) 391-8270 FAX 391-8740

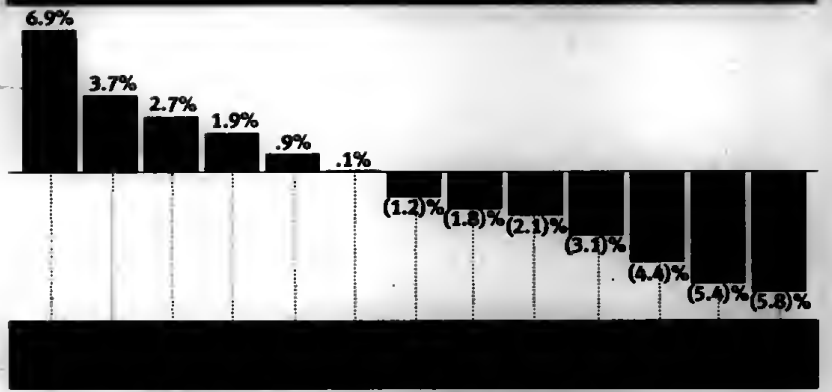
CAREER SURVEY: Subassemblies & components

INDUSTRY HIRING TRENDS

OVERALL GROWTH RATE



REGIONAL GROWTH ANALYSIS



CORPTECH, A DIRECTORY PUBLISHER IN WOBURN, MASS., TRACKS THE U.S.' 35,000 TECHNOLOGY MANUFACTURERS. THIS SURVEY RELATES TO THE 24,585 TRACKED FIRMS WITH LESS THAN 1,000 EMPLOYEES.

© Copyright 1993, Corporate Technology Information Services, Inc., Woburn, Mass.

Negotiating dilemmas

wheeling & dealing

The following are negotiating questions from information systems buyers. Joe Auer, president of International Computer Negotiations, Inc., a negotiations, consulting and training firm in Winter Park, Fla., is this week's guest adviser.

Master agreement pitfalls

Q IBM has been pushing us to sign its IBM Customer Agreement (ICA). It seems easier to read than other IBM contracts. Should I sign it without negotiating?

A I strongly recommend you get expert advice on this document before signing it. The ICA describes the rights and obligations of IBM and its customers. While it may feel friendlier, many important issues remain to be worked out after the agreement is in place.

The ICA involves a series of documents that can sequentially and subtly increase your legal commitment to IBM. Two such document types are Attachments and Transaction Documents, both of which override provisions of the ICA.

The Attachment's terms come into effect almost automatically when the product or service is either used or paid for (see chart). And when terms conflict in the various documents, the Attachment's terms prevail.

ACCEPTANCE OF ADDITIONAL TERMS

You accept the additional terms in an Attachment or Transaction Document in IBM's Customer Agreement by doing any of the following:

1. Signing the Attachment or Transaction Document.
2. Using the product or service and allowing others to do so.
3. Making any payment for the product or service.

Source: IBM's Customer Agreement contract

This poses problems for companies whose individual departments deal directly with IBM. Someone with no knowledge of the ICA or its Attachments can unknowingly override the original contract terms.

The terms of Transaction Documents also take precedence over those in the ICA. For each product order, IBM provides the appropriate Transaction Document, which confirms the specific details.

Critical issues such as machine quantity and type ordered, price, ship date and warranty are often addressed. If an individual department receives shipment of a product and uses it, the terms and conditions related to that product override previous agreements made with IBM — without the consent of the lawyers who approved the original contract.

Escrow worries

Q I'm in the process of negotiating a software license and have requested a release of the source code, but the vendor is reluctant. What can I do?

A Your best bet is a technology escrow agreement. If it is properly negotiated, an escrow arranges for the source materials to be held in an escrow deposit and released to you under contractually defined conditions. Consider the following when setting one up:

- Negotiate the escrow contract and license agreement at the same time. Once you sign the license agreement, you lose your leverage to negotiate the escrow. The contract should be a three-party arrangement with an independent agent.
- Include a provision stating that an update will be made to the escrow within a specified time after each release.
- Request technical verification rights to make sure the deposit is complete. You will want everything that's necessary for a runtime version of the software.
- Define conditions governing release of the materials. In addition to bankruptcy, this should include the vendor's failure to support the software. The escrow agent should be allowed to deliver materials to you without court instructions.
- Carefully define the escrow deposit's contents. Tell the vendor what you need in the escrow. The deposit should also contain information on licensing third-party software the vendor uses to maintain the software.
- Pay the escrow fees yourself. Also, try to negotiate a reduction in the annual software maintenance fees equal to the escrow's cost. If the vendor pays, make sure the escrow agent will notify you if the vendor defaults.
- Designate someone in your company to monitor communications with the escrow agent at all times.

Buy / Sell / Lease

Short Term Rentals on all New & Used Digital Equipment

Call for the Most Competitive Prices

CSI
Computex Systems, Inc.
83 Eastman Street
Easton, MA 02334
1 800-426-5499
In MA: (508) 230-3700
Fax: (508) 238-8250

Executive Infosource!

LARGE INVENTORY INCLUDING:
9221/120 9221/150
9221/130 Extensive stock of features
Call us for your 9370/9221 needs.
Executive Infosource!
Offering full service technical support.
CDLA 708 215-9370
fax 708 215-9992

DEMPSEY. WHERE IBM® QUALITY IS SECOND NATURE.

• RS/6000
• SERIES/1
• SYSTEM 36/38
• 9370
• INDUSTRIAL PC
• ES/9000
• AS/400

BUY–LEASE–SELL
• Processors
• Peripherals
• Upgrades

For preleased equipment, flexible financing, configuration planning, technical support and overnight shipping call

(800) 888-2000.

Dempsey BUSINESS SYSTEMS
Where IBM Quality is Second Nature.
18377 Beach Blvd., Suite 323 • Huntington Beach, CA 92648 • (714) 847-8486 • FAX (714) 847-5149
IBM Authorized Dealer Product Integrator
IBM is a registered trademark of International Business Machines Corporation

WE BUY
• HP 9000
• Data General
• RS/6000
• Data Products
• PC's Workstations
...AND WE SELL IT TOO!
(617) 982-9664
FAX (617) 871-4456

Buy/Sell/Trade
Data General
MV and AVIION Systems and All Peripherals
RAID Disk Systems by HiPerStor
Compatible with: Data General, SUN, HP, Novell & many others.
International Computing Systems
(800) 522-4272
Fax (512) 936-2680

REFURBISHED USED
• UPS SYSTEMS
• STANDBY GEN SETS
• LIEBERT A/C
• ACCESS FLOORING
262 S. Military Trail
Deerfield Beach, FL 33442
1-800-226-0784
305-425-0638

Buy / Sell / Lease

...omputerworld, you can ...our next trip to the library ... leaving your desk.

... introduces CW Online, a comprehensive, fully ...rry of Computerworld articles. With CW Online, you ... three most recent years of Computerworld issues. ... is updated weekly, so you can access new ...ry week. Research has never been so easy, so ... economical. Right from your personal computer.

...rt-up kit costs just $25.00 and includes everything ...art using CW Online including easy-to-use ...s software. After that, you'll be charged for ...ong with a $5.00 monthly account service fee. You ...our account up for us to bill your credit card or ...mpany on a monthly basis.

Call today for your CW Online start-up kit including communications software.

A library of COMPUTERWORLD articles

...ation or to order call 800-643-4668 today.

COMPUTER MARKETPLACE

BUY, SELL, LEASE & RENT

IBM

Systems, Peripherals, Parts & Services

Specializing in:

- RISC System/6000 (1 month rentals available)
- Workstations
- AS/400
- System/36
- Personal Computers
- Data Communications
- U. P. S. Systems
- Peripherals
- Upgrades
- Parts

COMPUTER MARKETPLACE

800-858-1144 Ext. 97

Computer Marketplace prides itself on being your one call computer hardware solution.

Corporate Headquarters
205 E. 5th St., Corona, CA 91719 • 909-735-2102

Computer Marketplace East
203-742-6848

Communication Division
609-730-1145

CDLA Official UDS/Motorola Distributor

Your used computer equipment deserves a second chance.

If you have used computer equipment to sell, *Computerworld's Product Classified Pages* are the best place to do your selling. That's because the *Product Classified Pages* feature a Buy/Sell/Lease section to help you market your equipment to the very people who are looking to buy.

And when you advertise in *Computerworld Product Classified*, you reach a total audience of over 629,000 computer professionals who turn to *Computerworld* for news, information, features - and the *Product Classified Pages* - every week.

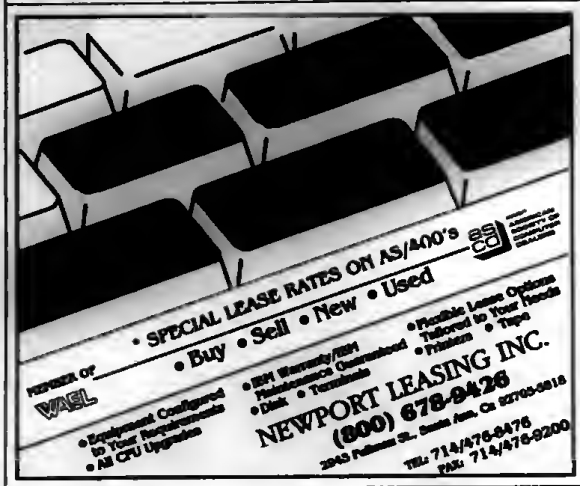
So give your used computer equipment a second chance today. To reserve your space, call:

800/343-6474
(in MA, 508/879-0700)



COMPUTERWORLD PRODUCT CLASSIFIED

Where computer buyers meet computer sellers Every Week.



Bids / Proposals / Real Estate

NEW YORK CITY TRANSIT AUTHORITY
NOTICE CM-835

The New York City Transit Authority is seeking to retain the service of a Professional Engineering Consultant to collect data and employ existing software to simulate parts of the IRT, BMT, and IND traction systems under normal operating conditions and under various contingency conditions.

The simulation results shall be empirically verified by the Consultant to demonstrate the validity of the software.

Existing software employed shall be capable of being licensed to the MTA for continued use on a IBM personal Computer with a 486 microprocessor.

In addition to traction power network simulation experience, the Consultant shall have the expertise necessary to review established maintenance procedures, and from that review, recommend optimum procedures and frequencies for the maintenance of substations and its equipment.

The Consultant shall have expertise in areas of: Traction Power Systems Studies - 70%, Review of Maintenance of Power Equipment - 20%, and Power Generation, Transmission and Distribution - 10%.

Consultants desiring to be considered to receive a Request for Proposal for this project must respond by submitting a letter of interest and completed SF254/255 forms, referencing File Number CM-835. The Submission must be received by the Authority no later than 12:00 Noon, September 16, 1993.

PLEASE NOTE: In evaluating a Consultant's response to this advertisement, the Authority considers only the information which is supplied in the Federal SF254/255 forms and information contained in Transit Authority Consultant Evaluation Reports on file, for work performed on prior Authority Projects. The Authority, therefore, requires all Consultants to refrain from submitting any material other than what has been requested. Send submission to:

Attn: Daniel Angoletti, Procurement Manager
Architectural/Engineering Services, Location 8032
New York City Transit Authority, Procurement,
130 Livingston Street, Brooklyn, NY 11201

MS CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by CDPA, 301 N. Lamar St. 301 Bldg., Suite 508, Jackson, MS 39201 for the following:

RFP 2483 due Thursday, September 30, 1993 @ 3:30 p.m. for the acquisition of a high performance computing facility for the Mississippi Center for Supercomputer Research. No Charge.

RFP 2484 due Thursday, October 7, 1993 @ 3:30 p.m. for the acquisition of a local area network for the Office of the Attorney General. No Charge.

RFP 2485 due Monday, September 20, 1993 @ 3:30 p.m. for the acquisition of 787 327X-type CRTs, 138 laser printers, 223 addressable line printers, four (4) 317-X-type 64-port controllers, 24 317X-type 32 port controllers, 37 317X-type 16 port controllers, and 105 327X emulation boards for the Mississippi Department of Human Services. No Charge.

A written request with correct payment only for RFPs with a charge. No phone requests. Corporate checks on a MS bank, certified check or POSTAL MONEY ORDER made out to CDPA. No cash or out-of-state checks. RFPs with no charge call Linda Watkins @ 601-359-2604. Pick up RFPs at CDPA between 1:00-3:00 only. CDPA reserves the right to reject any/all bids and to waive informalities.

INTERESTED IN STABILITY PROFESSIONALISM & ETHICS?

LOOK FOR THE LOGO!

dda

A NON-PROFIT TRADE ASSOCIATION

LET US MAKE A DIFFERENCE FOR YOU!

CALL TODAY
800-332-1130

1077-25 MAIN, CHELSEA, MI 48118



IMMEDIATE DELIVERY

ABBOTT
DEC • HP
FLUKE
IBM • MAC
SUN • NCR
PYRAMID
STRATUS

617.267.8600

Equipment Remarketing Co.
P.O. Box 71, Boston, MA 02215

PRODUCT CLASSIFIED PAGES

Where America's Computer Professionals Shop

(800) 343-6474
(in MA: 508/879-0700)

Education & Training

IT CAN TAKE DAYS TO LE... P...AM...

WE CAN KNOCK A FEW OFF.



Wasting time because your users don't know which keys to push? Let Hooleon replace the generic keys on your keyboards with software specific commands and color coded prompts. For very little cost, you can reduce training time and keyboard errors, and increase user acceptance of new systems. This upgrade is available for new or existing keyboards. Call today for your free custom key kit.

800/937-1337
Fax 602/634-4620
Dept. COMW
260 Justin Dr. • Cottonwood, AZ 86326

Hooleon CORPORATION



Do it Now!

GET SMARTER!

ELECTRONIC COMPUTER GLOSSARY is the ESSENTIAL reference for users, help desks, tech writers, trainers and IS staff. This award-winning, mini-encyclopedia on computers contains more than 6,000 definitions covering PCs to mainframes, communications, LANS, multimedia, DOS syntax, UNIX, major vendors, products and more. Site licenses let you include and distribute your own information via the world's simplest lookup engine. Updated quarterly. Single user only $29.95 for DOS or Windows. Site licenses start at $100 for 25 users.

The Computer Language Company, Inc.
5521 State Park Road
Point Pleasant, PA 18950

(215) 297-5999
FAX: (215)297-8424

Time & Services

ALICOMP, INC.
The "Boutique" of the Computer Services World

VM, MVS, VSE
Outsourcing/Timesharing/Consulting
Remote and On Site

Two *State of the Art* Locations
20,000 sq. ft. Manhattan complex
100,000 sq. ft. Secaucus, NJ complex

"Our Platform is Excellence"

Serving Clients Since 1980

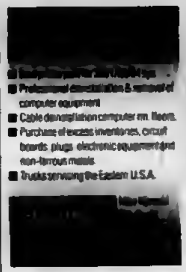
(212) 886-3600 • (800) 274-5556

COMPUTERWORLD
Product Classified Pages

delivers your message in companies that plan to buy your product or service.

From PCs to minis, mainframes to supercomputers, *Computerworld's* readers buy products across all ranges of today's computers. So if you're selling, advertise in the newspaper that delivers readers that plan to buy YOUR product or service. Advertise in *Computerworld's Product Classified Pages!*

For more information, call:
(800) 343-6474
(in MA, 508/879-0700)



- Professional deinstallation & removal of computer equipment
- Cable deinstallation computer rm. fixers.
- Purchase of excess inventories, circuit boards, plugs, electronic equipment and non-ferrous metals
- Trucks servicing the Eastern U.S.A.

It's the *Product Classified Pages*

Reach Computer Professionals Where They Shop For:

- ☐ Buy/Sell/Lease
- ☐ Conversions
- ☐ Hardware
- ☐ Software
- ☐ Communications
- ☐ Time/Services
- ☐ Training/Education
- ☐ Solutions Directory
- ☐ Peripherals/Supplies
- ☐ Business Opportunities
- ☐ Used Equipment Listings
- ☐ Graphics/Desktop Publishing
- ☐ Bids/Proposals/Real Estate

(800) 343-6474
(in MA., 508/879-0700)

Computing OUTSOURCING

NEVER a charge to the Buyer, because our fee is paid by the Seller.

We broker COMPUTER TIME and SERVICES on ALL platforms.

Since 1968 we have found your LOWEST prices from over 2000 nationwide data centers.

Call Don Seiden at:
COMPUTER RESERVES, INC
800 882-0988 (201) 882-9700

OUTSOURCING

REMOTE COMPUTING

MVS
VM
VSE
DB2
IMS/DBDC
CICS
TSO
ICCF

Extensive Software Library

Telenet Tymnet
Searsnet IBM Information Network

Extraordinary Customer Service
Migration Management

FANEUIL SYSTEMS (formerly) **GIS** INFORMATION SYSTEMS, INC

Your best choice for mainframe computing services.
815 Commerce Drive, Oak Brook, IL 60521 **708-574-3636**
New England 617-595-8000

SOLUTIONS DIRECTORY!

Increase your sales! Advertise 26 weeks in Computerworld's new Solutions Directory. Just $499 for all 26 weeks.

COMPUTERWORLD

Product Classified Pages give you buyers with extensive purchase influence.

In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in *Computerworld's Product Classified Pages!*

For more information, call
(800) 343-6474
(in MA, 508/879-0700)

COMPUTERWORLD
PRODUCT CLASSIFIED
Where computer buyers meet computer sellers. Every week.

Product Showcase



Custom Keyboards . . .
. . . For Custom Applications

- Custom Key Caps, Legends, Colors and Housings
- Custom Cables and Connectors
- Integrated Bar Code and Mag Card Readers
- Iso Point® Pointing Device
- Sun Compatible Keyboards
- Engineering, Development and Production
- Quick Turnaround and Prototypes
- 3 Year Limited Warranty

SOLUTIONS FOR YOUR SYSTEM INTEGRATION NEEDS

KeySource International
Division of United Plastics Corporation
2391 American Avenue
Hayward, CA 94545

PARTNERS IN QUALITY
TEL: 510-783-8086
800-722-8088 FAX: 510-783-2993



30¢/MB+LIFETIME WARRANTY!

- 3.5" 128MB rewritable optical disk drive is ***FAST*** and operates just like a hard drive
- Meets ISO-ANSI standards
- 1/3 to 1/6 the cost of SyQuest or Bernoulli
- No cheaper way to add disk storage, backup and exchange data or build multimedia libraries
- ***OPTICAL DISK is the Most solution!***

OPTO ADVANTAGE

128MB Internal Drive	$ 799.
128MB External SCSI	$ 899.
Portable 128MB	$ 999.
(Parallel Port interface, works with desktop or portable PCs)	
Rewritable Optical Disk 5 Pak (640MB)	$ 190.

*Lifetime warranty applies to manufacturer defects under normal use only

1-800-873-VALU

Solutions Directory

• Consultants • Value Added Resellers • Marketing Partners • OEMs • Systems Integrators • Distributors

To list your company so that Computerworld's readers can contact you directly, dial 800/343-6474, x744. Basic company listings will appear 26 consecutive weeks for just $499.

401(k) ADMINISTRATION

Delta Data Services, Inc. complete 401(k) Admin Software Columbus, Ga .(800) 451-9188

4GL

CompuSolve Associates
River Edge, NJ .(800) 847-6583

ACCOUNTING/PAYROLL

Arthur Ellingsen & Co.
Arlington Heights, IL .(708) 506-0555

ACCTG SOFTWARE/SERVICES

Management Information Consulting, Inc.
Falls Church, VA .(703) 845-5800

Myers-Holum, Inc.
New York, NY .(212) 753-5353

OPEN SYSTEMS® Accounting Software
Open Systems Holdings Corp. .(800) 328-2276

Phase 2 Consulting, Inc.
Cumberland, RI .(401) 333-4536

APPLICATIONS CONVERSION

Forecros Corporation
San Francisco, CA .(415) 543-1516

APPLICATIONS DEVELOPMENT

Avalon Engineering, Inc.
Boston, MA .(617) 247-7668

INTERBASE/PARADOX Consulting
Avalon Solutions, Inc. .(508) 520-1711

CompuSolve Associates
River Edge, NJ .(800) 847-6583

GREENBRIER & RUSSEL
PowerBuilder VAR .(800) 453-0347

Mastech Corporation: Nationwide
ORACLE, Sybase, Informix (412) 279-8400

Software Sourcing Company
Atlanta, Georgia .(404) 898-7900

Planet Data/Paradox Windows Programming
Moriches, New York .(516) 878-8603

CABLING SERVICES

DATA CONNECTION WORLDWIDE-Design & Install Throughout the World .(800) 283-2821

Nationwide, 250+ Local Service Locations
Premises One LAN SERV .(800) LAN-SERV

CLIENT SERVER DEVELOPERS

ACR Inc. (PowerBuilder VAR)
New York, NY .(212) 629-3370

INTERBASE/PARADOX Consulting
Avalon Solutions, Inc. (508) 520-1711

R.M. Boerms, Inc.
Hazleton, PA .(717) 454-8159

Chen & Assoc., Inc.: PowerBuilder, Visual Basic, etc.
Baton Rouge, LA .(504) 928-5765

Client Server Systems, Inc.
Wellesley, MA .(617) 239-8065

Greenbrier & Russel (800) 453-0347
Specializing in client server application development in addition to comprehensive mainframe and midrange consulting services, education programs for AS/400, DB2, client/server and software products.

Mastech Corporation: Nationwide
PowerBuilder, Gupta, Visual Basic .(412) 279-8400

INFORMIX/ORACLE/SYBASE/POWERBUILDER
NexGen SI (PowerBuilder VAR) (404) 551-8210

PowerCerv (PowerBuilder VAR)
Tampa, FL .(813) 281-2990

SOFTWORLD Corp (407) 995-8436
OS/2 Software Development & Consulting

WATERFIELD: PowerBuilder Sales & Consulting
Lexington, MA .(617) 863-8400

Zeitech, Inc.
Stamford, CT .(203) 359-9807

CONTRACT PROGRAMMING

INFORMIX/ORACLE/SYBASE/UNIX
ACJ & Associates .(800) 264-8686

MS Windows/C/C++ experts!
Eureka Springs, AR .(501) 253-8087

Jerry Cohen & Associates
Portland, OR (503) 289-7706

ORACLE/PARADOX-Offsite Work Preferred
Laurel Hill Software Inc. .(800) 554-2678

Mastech Corporation: Nationwide
UNIX, RDBMS, GUI .(412) 279-8400

PowerCerv (PowerBuilder Specialists)
Tampa, FL (813) 281-2990

Software Sourcing Company
Atlanta, Georgia .(404) 898-7900

CORPORATE/GOVERNMENT BBS

Summit Software Services, Inc.
Camarillo, CA (800) 307-0034

CUSTOMER SERVICE

The Help Desk, Inc.
Phoenix, AZ .(602) 460-1926

PowerCerv (PowerBuilder-based application)
Tampa, FL .(813) 281-2990

DATA CONVERSION

Data Conversion, Inc.
Minneapolis, MN .(612) 525-0649

DBMS

Advanced Data Management (800) 962-4377
Document DATABASE TOol for the Professionals. We have VAR and Dist. programs available. Call/Write 15 Main St. Kingston, NJ 08528.

INTERBASE/PARADOX Consulting
Avalon Solutions, Inc. .(508) 520-1711

CompuSolve Associates
River Edge, NJ .(800) 847-6583

On-Line Systems Group
St. Petersburg, FL .(800) 322-5265

DISASTER RECOVERY

Computer Security Consultants, Inc.
Ridgefield, CT (800) 925-2724

Advanced Information Management (703) 643-1002
Woodbridge, VA FAX .(703) 643-2722

Raymond Professional Management, Inc.
Roswell, GA .(404) 587-4090

Recovery Management, Inc.
REXSYS® Software .(800) RMI-8866

Stroh! Systems
LDRPS Software .(800) 634-2016

EDUCATION & TRAINING

GREENBRIER & RUSSEL
AS/400, DB2, Client Server (800) 453-0347

IS Training Services (508) 635-9819
Specializing in technical and non-technical training solutions and educational consulting services designed to support the entire IS function - including the clients of IS. **40+ years of experience!** Contact: Boy Tarr, & Associates, 5 Old Meadow Lane Acton MA 01720

Skill Dynamics, An IBM Company
A full service training company that specializes in technical and business training, consulting, outsourcing and customized offerings. Call 1800 IBM TEACh for a free catalog.

MIS Training Institute (508) 879-7999
Framingham, MA. Fax(508) 872-1153

Object Oriented Preparation Services, Inc
Robbinsville, NJ .(609) 259-0601

ELECTRONIC DATA INTERCHANGE

DNS Associates, Inc.
Burlington, MA .(800) 624-6354

EDI Able, Inc
Malvern, PA .(215) 993-0813

Impact Int'l Technologies, Inc.
Princeton, NJ .(609) 734-7411

ENTERPRISE RESOURCE PLNG

FOURTH SHIFT CORPORATION **(JIT)**
Minneapolis, MN .(800) 433-2467

EXECUTIVE INFORMATION SYSTEMS

XENOS Corporation
Dallas, TX .(214) 869-9860

EXPERT SYSTEMS

FOUNDATION TECHNOLOGIES, INC
Boston, MA (617) 720-2760

OXKO Corporation
Annapolis, MD .(410) 224-3314

FOCUS

FOCAL SYSTEMS, INC. Focus Consulting
Seattle, WA .(206) 788-4467

GOV'T/MUNICIPALITIES

Arthur Ellingsen & Co.
Arlington Heights, IL .(708) 506-0555

MMA Consulting Group, Inc.
Boston, MA (617) 426-8049

GROUP WARE/E-MAIL

ACR Inc (Lotus Notes VAR)
New York, NY .(212) 629-3370

GUI FRONT ENDS

WATERFIELD: PowerBuilder Sales & Consulting
Lexington, MA .(617) 863-8400

HEALTH CARE

Systems Resources Corp.
Burlington, MA .(617) 270-9228

HELP DESK

The Help Desk, Inc.
Phoenix, AZ .(602) 460-1926

PowerCerv (PowerBuilder-based applications)
Tampa, FL .(813) 281-2990

HUMAN RESOURCE SOFTWARE

SPECTRUM Human Resource Systems Corporation
Denver, CO (800) 334-5660

HUMAN RESOURCE SYSTEMS

PC/LAN Personnel, Benefit, and HR Systems
STS, Inc. Rolling Meadows, IL .(800) 227-2729

INFO DELIVERY SOFTWARE/SVCS

GenText, inc
Dallas, TX .(214) 691-0300

IMAGING

Avalon Engineering, Inc.
Boston, MA .(617) 247-7668

Grumman InfoConversion
Holtsville, NY (516) 737-7188

Imaging Expo, NY
Sept. 28-30 .800 44-IMAGE

ISO 9000

ISO 9000 Doc. Mgmt. Systems
OXKO Corporation .(410) 224-3314

MANUFACTURING SOFTWARE

ROI Systems, Inc -MANAGE 2000 Product
Minneapolis, MN 55426 .(800) 544-7849

Intrepid Software, Inc
Burlington, MA .(617) 273-2920

Man-Trak® Management Tracking System
Open Systems Holdings Corp. (800) 328-2276

PowerCerv (PowerBuilder/Sybase application)
Tampa, FL .(813) 281-2990

Silverline Industries, Inc
Oakbrook, IL (ORACLE VAR) .(708) 571-5555

MIGRATION SOFTWARE/CONSULTING

GenText, Inc.
Dallas, TX .(214) 692-0300

OFF SHORE SOFTWARE DEV

Mastech Corporation: Nationwide
Excellent Quality - Cost Effective (412) 279-8400

R Systems, Inc., California (916) 631-1503
"Quality Software Developed in India" SAVE $$$!!!

Software Sourcing Company
Atlanta, Georgia .(404) 898-7900

OFF-SITE SOFTWARE DEVELOPMENT

ORACLE/INFORMIX/SYBASE/UNIFACE/Multimedia apps.
Silverline Industries, Inc., Oakbrook, IL (708) 571-5555

OS/2 SERVICES

SOFTWORLD Corp. (407) 995-8436
OS/2 Software Development & Consulting

OUTSOURCING

Advanced Data Management (800) 624-3772
A full service system integrator. Design through implementation, all major databases and tools. Call/Write 15 Main St. Kingston, NJ 08528.

Computer Utilization Services Corp
Birmingham, AL .(205) 933-0555

MCRB Service Bureau, Inc.
3090 Computer .(800) 941-MCRB

PAYROLL SYSTEMS

SPECTRUM Human Resource Systems Corporation
Denver, CO (800) 334-5660

PC/LAN Payroll, HR, and Tax Systems
STS, Inc. Rolling Meadows, IL .(800) 227-2729

PRODUCTIVITY

Productivity Management Group, Inc
East Amherst, NY .(716) 689-7724

PROJECT MANAGEMENT

Pitagorsky Consulting/Training
New York, NY .(212) 696-9687

PURCHASING SOFTWARE

Commerce Software, Inc.
Elmsford, NY .(914) 592-2102x302

RIGHTSIZING

UNIX, C, C++, DOS, WINDOWS, PRO-IV
Avalon Solutions, Inc. .(508) 520-1711

MCRB Service Bureau, Inc.
3090 Computer Services .(800) 941-MCRB

SALES FORCE AUTOMATION

Scherrer Resources, Inc. (Sales Ally Software)
Philadelphia, PA 19118 .(800) 950-0190

SECURITY

National Computer Security Association
Carlisle, PA .(717) 258-1816

Phase 2 Consulting, Inc.
Cumberland, RI .(401) 333-4536

RSH Consulting, Inc.
Newton, MA .(617) 969-9050

System 613, Inc.
RACF/Systems (914) 425-7758

VANGUARD Integrity Professionals
Information Security Admin & Audit .(714) 939-0377

SECURITY/PHYSICAL

Z-Lock Manufacturing Co
Redondo Beach, CA 90277 .(310) 372-4842

SPEECH INTEGRATION

Zeitech, Inc.
Stamford, CT .(203) 359-9807

STORAGE MGMT SOFTWARE SVCS

Adept
Riverside, CA .(909) 688-7012

SUPPLY CHAIN MANAGEMENT

American Software, Inc.
Atlanta, GA .(404) 264-5296

WHOLESALE DISTRIBUTION

Arthur Ellingsen & Co.
Arlington Heights, IL .(708) 506-0555

ADD+ON® Software Advantage/V
Open Systems Holdings Corp (800) 328-2276

The world's #1 network computing show.

The world's #1 multimedia show.

The world's #1 OEM sources show.

The world's #1 office systems show.

The world's #1 IT event for resellers and corporate decision makers.

- **Over 2,000 exhibitors**—see it all on the industry's biggest show floor!
- **Thousands of new products**—discover the latest integrated solutions to make your business more productive!
- **90-session conference**—follow the experts to more productivity!
- **Keynote** from Apple's John Sculley!
- **CEO Perspectives** from Microsoft's Bill Gates, Sun's Scott McNealy and Computer Associates' Charles Wang!



COMDEX/Fall'93

November 15–19, 1993
Las Vegas, Nevada USA

Receive your registration form by fax—and reserve your hotel accommodations while they last!
Call 617-449-5554, enter Code 31 and key in your fax number —we'll fax your registration form within 24 hours!

© 1993 The Interface Group • 300 First Avenue, Needham, MA 02194-2722 USA

SALES OFFICES

Associate Publisher/Senior Vice President Sales
Kevin McPherson

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-879-0446

BOSTON: Vice-President Eastern Advertising Sales/David Patterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Wells, Sales Associates/Alice Langley, Lisa Gale, Linda Clinton, COMPUTERWORLD, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 872-2915

CHICAGO: District Manager/Sharon R. O'Brien, COMPUTERWORLD, 980 N. Michigan Avenue, Suite 1440, Chicago, IL 60611 (312) 214-3005 FAX: (312) 214-4082

NEW YORK: Senior District Manager/Fred LoSapio, District Managers/Paula D'Amico, Rich Mowers, Sales Assistants/Susan Kusnic, Jean Dellarobba, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786

LOS ANGELES: Southwestern Regional Manager/Fred Cowan, COMPUTERWORLD, 19800 MacArthur Blvd., Suite 950, Irvine, CA 92715 (714) 757-8123 FAX: (714) 757-8124

SAN FRANCISCO: Vice-President Western Advertising Sales/Richard Espinoza, Executive Assistant/Lisbeth Lohero, Senior District Managers/Ernie Chamberlain, Kaye Shanbrough, District Managers/Michele Gerva, Christine Curry, Sales Assistants/Candace Sylvain, Emily Gayton, Ana Medeiros, Connie Sanchez, COMPUTERWORLD, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-6555 FAX: (415) 347-6312

ATLANTA: Senior District Manager/Bernie Hockenswith, Sales Assistant/Robert Bigelow, COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0756 FAX: (404) 235-5123

DALLAS: Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Stegman, COMPUTERWORLD, 14851 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882 FAX: (214) 385-1603

WASHINGTON, D.C.: District Manager/Rich Moldan, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 487-0090 FAX: (201) 712-9786

BOSTON PUBLICATIONS:

Vice President/Lucy Cronan, Director of Publishing Services/Carolyn Rowsch, Sales Assistant/Heidi Schuberthan, (800) 343-6474 FAX: (508) 879-0446

CLASSIFIED ADVERTISING SALES:

Vice President/Classified Advertising/John Corrigan, Marketing Director/Derek E. Hultsby, 375 Cochituate Rd., Framingham MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

PRODUCT CLASSIFIED:

Sales Manager/Connie Martin Kearns, Sales Supervisor/Ted McNulty, Midwest Account Executive/F. Jay Sewell, Solutions Director/Nancy Whitmer, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:

New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700, Account Executive/Karen Leske, (800) 343-6474, In MA (508) 879-0700

Mid-Atlantic: Regional Manager/Valerie Gelbe, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Caryn Diett, (800) 343-6474

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (708) 827-4433, Sr. Account Executive/Ellen Cross (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Sr. Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:

East: Account Manager/Norma Iamburmo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Executive/36 Glen, 18008 Skypark Circle, Ste 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:

President/Frank Cutitta, Eastern Advertising Manager/Veronique Lamarque, 187 Oaks Road, Framingham MA 01701 (508) 879-0700

Western Advertising Manager/Ginny Pohlman, 180 Harbor Drive, Suite 215, Sausalito, CA 94965 (415) 331-7571 FAX: (415) 332-0779

Apple Computer **38-39**
AT&T Network Cable Systems **21**
Borland International **C4**
Chipcom **C3**
Cisco **9**
Cognos Corp **104-105**
Command Technology **83**
Communication Networks **112**
Computer Associates **3**
Computers for Classrooms **76**
Computerworld on CD **86**
CW Circulation **98-99**
CW Classified **47, 88, 89, 78, 95**
CW Consultants Directory **24**
CW Editorial Award **100**
Cyrix **58-59**
Data Products **88-89**
DCA **46-47**
Dell Computer **88-89, 91**
Digital Equipment Corp **58-61, 111**
Elcon Technology **90**
Emerging Technology Applications **94**
Hewlett-Packard **16-19, 36**
IBM **55-57, 66-67, 78-79, W2-W4**
IBM Personal Software Products **13, 103**
Information Builders **17**
Innovation Data Processing **7**
Interface Group **127**
Interleaf **80-81**
IPL **84-85**
Knowledgeware **82, 83**
LBMS **87**
Lotus Development Corp. **75**
Micro Focus **11, 25**
Microsoft **108**
Motorola **22-23**
Motorola/Codex **92-93**
NCR **34-35**
NEC **72-73**
Novell **70**
Oracle **5**
Pennant Systems **26-27**
Platinum Software **30-31**
Powersoft **82**
Progress Software **42, 43, 45**
Racal Datacom **40**
Ross Systems **94-95**
SAP America **106**
SAS Institute **29, 98, 110**
3M **52**
Unisys **48**
Wang **10**
Workstation Group **110**
XcelleNet **15**
X/Open **20**

Box index is provided as an additional service.
The publisher does not assume any liability for errors or omissions.

CW PUBLISHING INC.

An IDG Company: The World's Leader in Information Services on Information Technology

CEO & Publisher
Gary J. Beach

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-875-4394

Bill Lohero	Kevin McPherson	Matthew Smith	Steven F. Wolf
Senior Vice-President Editorial	**Associate Publisher Senior Vice President/Sales**	**Senior Vice-President Operations**	**Senior Vice-President Marketing**

PUBLISHER'S OFFICE **Executive Assistant to the CEO/Publisher:** Karen Elliott. **SALES - DISPLAY Advertising Director:** Carolyn Rowsch. **Display Advertising Production Manager:** Maureen Hanley. **Display Advertising Coordinators:** Peggy Hennessey, Paula Wright. **SALES - CLASSIFIED Vice President Classified Advertising:** John Corrigan. **Classified Marketing Director:** Derek E. Hultsby. **Product Classified Sales Manager:** Connie Martin Kearns. **Classified Operations Director:** Cynthia Delany. **MARKETING Director, Marketing Communications:** Mary Doyle. **Account Manager, Marketing Communications:** Elizabeth Phillips. **Manager, Trade Show & Conventions:** Audrey Strohan. **Marketing Communications Project Coordinator:** Susan Thayter. **Administrative Assistant:** Patty Faherty. **CIRCULATION Vice-President Circulation:** Gail Odenwald. **Director of Circulation Management:** Maureen Burke. **PRODUCTION Production Director:** Christopher P. Cotter. **Production Manager:** Beverly Wolff. **SYSTEMS Vice President Information Systems:** Linda Hebert. **Administrative Sales Assistant:** Lois Bennett.

GLOBAL LEADERSHIP NETWORK

FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argento, CW Communicaciones S/A Av. Belgrano 468-Pso 9 CP 1092 Buenos Aires. Phone: (0111) 941 342 5643. Telex: (390) 22644 IBAZAN AR. FAX: (0111) 541 331 7672

ASIA: S.W. Chan, Asia Computerworld Communications Ltd., 701-4 Hunt Chung Bldg., 54 Jaffe Road Wanchai, Hong Kong. Phone: (011) 852 461 3238. FAX: (011) 852 861 0963

AUSTRALIA: Bob Kennedy, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4396133. Telex: (790) 8074752 (COMNET). FAX: (011) 61 2 439 5912

AUSTRIA: Manfred Weis, IDG Communications Verlagges. m.b.H. Zeitgasse 6, A-1070 Wien, Austria. Phone: (011) 43 222 523 16 310. Telex: (847) 115542 (SOV/A) FAX: (011) 43 222 523 05 08 33

BRAZIL: Vay Raet, Computerworld do Brasil Ltda. Praca Floriano, 19/26 Andar. 20031 Rio de Janeiro, RJ Brasil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30830 BR Sao Paolo: Computerworld do Brasil Ltda. Rua Joaquim Floriano, 466/3 andar-CEP 04534 Sao Paulo, Brasil. Phone: (011) 55 11 852 8536. Telex: (391) 21 30838 (WORD BR). FAX: (011) 55 21 240 7759

COLOMBIA: Cleo B. Wilson, Computerworld Colombia, Transversal 33 No. 58-38, Apdo. Aereo 54018 Bogota Colombia. Phone: (011) 571 340 0190. FAX: (011) 571 211 0848

DENMARK: Preben Engell, IDG Danmark A/S, Nannasgade 4 DK-2200 Kbh, Denmark. Phone: (011) 45 36 442800. Telex: (855) 31348. FAX: (011) 45 36 442033

FRANCE: Patrick Chaussonniere, IDG Communications France, Immeuble La Fayette, 2, Place des Vosges, Cedex 05, 92051 Paris la Defense France. Phone: (011) 33 1 4904 7800. Telex: (842) 613234F. FAX: (011) 33 1 4904 7800

GERMANY: Eckhard Wiputeit, IDG Communications Verlag AG, Rhe-nstrasse 2/4/6, Postfach 46 04 29, 8000 Munich 46, Germany. Phone: (011) 49 89 360860. Telex: (841) 5215390 (COMD D). FAX: (011) 49 89 3 60 86109

HUNGARY: Istvan Biro, IDG Communications Hungary Publisher Ltd., 1016 Budapest, Gellerthegy u.30-32, Postal address-H-1536, Budapest, P.O.B. 306 Hungary. Phone: (011) 36 1 156-9122. Telex: (863) 226307 (Kshp H). Fax: (011) 361 1 202 0565

INDIA: Ramon Khajuria, Media Transasia India Ltd. 103 Anand Lok, New Delhi 110049 India. Phone: (011) 91 11 644 0110. FAX: (011) 91 11 642 3950

ITALY: Brunetto Boero, IDG Communications Italia Via Mecenate 90/14 20138 Milano, Italy. Phone: (011) 39 2 58 01 16 40. Telex: (843) 335318. FAX: (011) 39 2 58 01 16 70

JAPAN: Jun Person, IDG Communications/Japan, Kiocho TBR Bldg. 6F En 4th 5-1 Kojimachi, Chiyodaku Tokyo 102 Japan. Phone: (011) 81 33 3222 0411. Telex: (781) 252 4217. FAX: (011) 81 33 3222 0965

MEXICO: Henry Morsten, Computerworld Mexico S.A. de C.V., Gonzalez de Cosgio #334, Colonia del Valle, 03100 Mexico D.F. Phone: (011) 52 5 669 4454. Telex: (383) 177 1300 (ACHAME). FAX: (011) 52 5 669 1140

THE NETHERLANDS: Ruud Bakker, IDG Communications B.V. Schipholweg 1/P.O. Box 5448, 2034 LS/2000 GA Haarlem, The Netherlands. Phone: (011) 31 23 306 614. Telex: (844) 18242 (CWCOM NL). FAX: (011) 31 23 366 184

NEW ZEALAND: Maxine Taylor, IDG Communications Ltd., 2nd Floor 15 Augustus Terrace, Parnell, Auckland 1, New Zealand. Phone: (011) 64 9 779 902. Fax: (011) 64 9 774 604

NORWAY: Morten Hansen, CW Norge A/S, Hovmoleen 43, 0976, Oslo 9, Norway. Phone: (011) 472 641725. Telex: (856) 76476 (CW NOR N). FAX: (011) 47 248 0152

PEOPLE'S REPUBLIC OF CHINA: Shen Yao, China Computerworld, 74 La Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 861 81 0044. Telex: (716) 222714 (CCW CN). FAX: (011) 861 821 7849

RUSSIA: Boris Arsenuk, Information Computer Enterprise, Prospekt Mira 187-98-22, UDNH, pavilion 64, 129223 Moscow, USSR I.C.E. Phone: (011) 709 5 187 6830. Telex: (871) 441 354. FAX: (011) 709 5 188 5665.

SINGAPORE: S.W. Chan, Asia Computerworld Communications, 04-07 Parkway Builders Centre, No 1 Marine Parade Central, Singapore 1544, Republic of Singapore. Phone: (011) 65 345 8383. Telex: (786) RS 37003 (Comvor). FAX: (011) 65 345 7487

SPAIN: Pere Zabala, IDG Communications, S.A., Rafael Calvo 18, 4B, 28010 Madrid, Spain. Phone: (011) 34 1 319 4014. Telex: (831) 45622 (CW E). FAX: (011) 34 1 319 6104

SWEDEN: Bengt Mamfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8667 0190. Telex: (854) 14904 (NOVACW). FAX: (011) 46 8665 3132.

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Wilhelmstrasse no. 15, Postfach 253, CH 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (854) 814710 (CWCI CH). FAX: (011) 41 1 55 1135.

TAIWAN: Harry Yen, IDG Communications/Taiwan, 11F-B, No 167, Section 1, Fu Hsin South Road, Sec. 1, Taipei 10639, Taiwan, R.O.C. Phone: (011) 886 2 721 4302. FAX: (011) 886 2 777 5339.

UNITED KINGDOM: Ian Thalmessinger, CW Communications Ltd., 99 Grays Inn Rd., London WC1 6UT, United Kingdom. Phone: (011) 44 71 831 9252. FAX: (011) 44 71 978 0271. Colin Smith, Oliver Smith & Partners, Ltd., 38 Albemarle Mews, 68 Clapham Park Road, London SW4 7BX, United Kingdom. Phone: (011) 44 71 978 1440. FAX: (011) 44 71 978 1550

VENEZUELA: Kalman von Vayna Nagy, IDG Comunicaciones C.A., Torre Maracaibo Piso 13, Oficina H Av. Lobatejer Caracas, Venezuela. Phone: (011) 58 2 72 74 30. FAX: (011) 58 2 724970

INTERNATIONAL DATA GROUP

Patrick J. McGovern	Walter Boyd	William P. Murphy
Board Chairman	**President**	**Vice President/Finance**

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 194 computer publications in 62 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA's Computerworld Argentina, Infoworld Argentina; ASIA's Computerworld Hong Kong, PC World Hong Kong, Computerworld Southeast Asia, PC World Singapore, Computerworld Malaysia, PC World Malaysia; AUSTRALIA's Computerworld Australia, Australian PC World, Australian Macworld, Network World, Reseller; IDG Sources; AUSTRIA's Computerwelt Oesterreich, PC Test; BRAZIL's Computerworld, Mundo IBM, Mundo Unix, PC World, Publish; BULGARIA's Computerworld Bulgaria, Edworld, PC & Mac World Bulgaria; CANADA's Direct Access, Graduate Computerworld, InfoCanada, Network World Canada; CHILE's Computerworld, Informatica; COLOMBIA's Computerworld Colombia; CZECH REPUBLIC's Computerworld, Elektronika, PC World; DENMARK's CAD/CAM WORLD, Communications World, Computerworld Danmark, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Windows World; ECUADOR's PC World; EGYPT's Computerworld/CW Middle East, PC World Middle East; FINLAND's Mikro PC, Tietoviikko, Tietoverkko; FRANCE's Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux; GERMANY's Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unix; HUNGARY's Alaplap, Computerworld SZT, PC World; INDIA's Computers & Communications; ISRAEL's Computerworld Israel, PC World Israel; ITALY's Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC World Italia; JAPAN's Computerworld Japan, Macworld Japan, SunWorld Japan, Windows World; KENYA's East African Computer News; KOREA's Computerworld Korea, Macworld Korea, PC World Korea; MEXICO's Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows, The NETHERLAND'S Computer Totaal, LAN Magazine, MacWorld; NEW ZEALAND'S Computer Listings, Computerworld New Zealand, New Zealand PC World; NIGERIA'S PC World Africa; NORWAY'S Computerworld Norge, C/World, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish World, Student Data, Unix World, Windowsworld; IDG Direct Response; PANAMA'S PC World; PERU'S Computerworld Peru, PC World; PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, PC World China, Electronics International, IDG HIGH TECH BEIJING'S New Product World; IDG SHENZHEN'S Computer News Digest, PHILIPPINE'S Computerworld, PC World; POLAND'S Computerworld Poland, PC World/Komputer; PORTUGAL'S Centro/PC World, Correio Informatico/Computerworld; Macin; ROMANIA'S PC World; RUSSIA'S Computerworld Moscow, Mir-PC, Sety; SLOVENIA'S Monitor Magazine; SOUTH AFRICA'S Computing S.A.; SPAIN'S Amiga World, Computerworld Espana, Communicaciones World, Macworld Espana, NextWORLD, PC World Espana, Publish, Sunworld; SWEDEN'S Attack, ComputerSweden, Corporate Computing, Lokala Natverk, LAN, Lotus World, MAC&PC, Macworld, Mikrodatorn, PC World Publishing & Design (CAP), Datavingarnas Man Data, Windows World; SWITZERLAND'S Computerwelt Schweiz, Macworld Schweiz, PC & Workstation; TAIWAN'S Computerworld Taiwan, Global Computer Express, PC World Taiwan; THAILAND'S Thai Computerworld; TURKEY'S Computerworld Monitor, Macworld Turkiye, PC World Turkiye; UKRAINE'S Computerworld; UNITED KINGDOM'S Lotus Magazine, Macworld, Sunworld; UNITED STATES' AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Desktop Video World, DOS Resource Guide, Electronic News, Federal Computer Week, Federal Integrator, GamePro, IDG Books, Infoworld, Infoworld Direct, Laser Event, Macworld, Multimedia World, Network World, NeXTWORLD, PC Games, PC Letter, PC World, Publish, Sumeria, Sunworld, SWATPro, Video Event; VENEZUELA'S Computerworld Venezuela, MicroComputerworld Venezuela; VIETNAM'S PC World Vietnam.

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:
COMPUTERWORLD, P.O. Box 2043, Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Name
Title
Company
Address
City State Zip

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.

Your New Address Goes Here

Name

Company

Address

City State Zip

Address shown: ❑ Home ❑ Business

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available:

1-800-669-1002
Outside U.S. call (614) 382-3322

COMPUTERWORLD
The Newspaper of IS
P.O. Box 2043, Marion, Ohio 43305

Companies in this issue

Page number refers to page on which story begins

2010 Software Corp. 46
3Com Corp. 2,107

A

Acer America Corp 2
ADM Consulting, Inc. 4
Altos Computer Systems 83
American Airlines 83
American Greetings Corp. 115
Ameritech Corp. 12
Andersen Consulting Cover1
Answer Compoter, Ioc. 43
Apple Computer, Inc. 2,4,7,8,16,42,61
Approach Software Corp. 37
Ardis 12
The ASK Group, Inc. 8,37
AskSam Systems 37
Aspect Telecommunication 64
Associated Grocers, Inc. 64
AST Research, Inc. 2
AT&T 12,24,61
Automated Design Systems, Inc. 107
Avco Financial Services, Inc. Cover1
Axil Workstations 131

B

Bachman Information Systems, Inc. 131
Banyan Systems, Inc. 10,64
BevMark, Inc. 74
BIS Strategic Decisions 77
Blyth Software, Inc. 86
BMC Software, Inc. 79
Borland International, Inc. 2,37,83,107
Bowater, Inc. 101
BP Oil Co. 37
BT North America, Inc. 24
Bus-Tech, Inc. Cover1

L

Cabletron Systems, Inc. 74
Cablevision Systems Corp. 74
Calera Recognition Systems, Inc 59
Celex Systems, Inc. 7
Cirrus Logic, Inc. 4
Coca-Cola Co. 74
CodeMaster Corp. Cover1
Compaq Computer Corp 2,24,37,41,107
CompuAdd 115
Computer Associates International, Inc. 4,74
Convex Computer Corp. 24,71
Cooperative Solutions, Inc. 131
Cray Research, Inc. 71
Creative Labs, Inc. 37

D

Data Access Corp. 77
Data General Corp. 46
Datacap, Inc. 77
Datapoint Corp. 83
Dataquest, Inc. 24,64
Datastructures 71
Da Vinci Systems Corp. 15
Dell Computer Corp. 37,41
Delrina Corp. 69
DeskStation Technology, Inc 46
Dialog Informatioo Services 24
Digital Communications Associates, Inc. Cover1,64
Digital Equipment Corp. 6,16,41,49,59,61, 63,71,90,107,113
Dominick's Finer Foods, Inc. 115
Drexel Uoiversity 6
Dunkin Donuts, Inc. 90
Du Pont Co. 6

L

Electric Power Research Institute 6
Epson America, Inc. 46

F

FLX Corp. 46
Forrester Research, Inc. 12
Forward Concepts 44
FourGen Software, Inc. 83
Fujitsu Personal Systems, Inc. 6
Future Domain Corp. 2

G

Gannett Co. 4
Garb-Ko, Inc. 4
Gartner Group, Inc. Cover1,8,43,49,131
Gateway 2000, Inc. 41
Genesys, Inc. 69
GMIS, Inc. Cover1
Goodyear Tire & Rubber Co. 37
GTE Corp. 24
Gupta Corp. 90,113

H

Health Care Information Systems, Inc. Cover1
Health Insurance Association of America Cover1
Health Payment Review, Inc. Cover1
Hewlett-Packard Co. Cover1,41,44,49, 71,77,107
Hitachi Data Systems Corp. 16
Hockware, Inc. 90
Hoechst Celanese Corp. 6
Home Insurance Co. 6
Hughes Supply, Inc. 77
Hyundia Electronics America 131

I

IBM PC Co. 8,16,24,37,43,46
IBM Cover1,2,4,7,16,41,53,59, 63,69,71,79,83,86,107,123,134
Illuminata 49
Inference Corp. 86
Information Dimensions, Inc. 59
Information Partners of Boston 131
Information Systems Group, Inc. 24
Informix, Inc. 37,83
Ingram Micro 134
Intel Corp. 2,46,69
Intelligent Electronics 132
Interex 71
International Computer 46
International Computer Negotiations, Ioc. 123
International Data Corp. 63,64,77
Intersecting Concept 59
Iris Associates 2
ITT Hartford Lile Cos. 101
IVI Travel, Inc. 71

J

JC Peaney Co. 43
JYACC, Inc. 61

X

Kerr-McGee Corp. 8
KnowledgeWare, Inc. 8
KPMG Peat Marwick 16

L

LANovation 107
Lawson Software 74
Legato Systems, Inc. 10
Liant Software Corp. 83
Lockheed Missiles and Space Co. 4
Lotus Development Corp. 2,7,8,16,37, 69,107,131
Lower Colorado River Authority 115
Lucid, Inc. 95
Lysis Corp. 59

M

Magic Software Enterprises, Inc. 90
Manulife Financial 24
McData Córp 64
McDonnell Douglas Corp. 74
Medicode, Inc. Cover1
Memorex Telex Cover1
Metropolitan Fiber Systems, Inc. 61
Meta Group, Inc. 115
Micro Decisionware, Inc. Cover1
Microcom, Inc. 64
Microsoft Corp. Cover1,2,8,16,37, 63,69,83,86,90,107
MingleWood Data Systems, Inc. 95
Motorola, Inc. 77
Must Software International 95

N

Nalco Chemical Co. 24
Napeo International 90
NASA Ames Research Center 49
National Center for Supercomputing Applications 49
National Easter Seal Society 83
National Health Care Anti-Fraud Association Cover1,14
National Science Foundation Cover1
National Semiconductor Corp. 2
NCR Corp. Cover1
Network General Corp. 107,134
New Science Associates, Inc. 131
New York State Assembly Cover1
Newport News Shipbuilding and Drydock Co. 63
Next, Inc. 16
Nordstrom, Inc. Cover1
Northwestern Mutual Lile Insurance Co. 61
Novell, Inc. Cover1,2,4,8,10,12,15, 46,59,61,64,74,77,90,107,115

O

On Technology Corp. 46
One Source Division 131
Open Software Foundation 83
OpenVision 71
Optika 77
Oracle Corp. 2,4,8,37,83,90,95,134

P

Pacific Brokerage Services, Inc. 61
Pacific Gas & Electric Co. 10
Pacific Studies Center 131
PacifiCare Health Systems, Inc. 83
PageNet, Inc. 83
Paging Network, Inc. 83
Palo Alto Management Group, Inc. 74
Parallan Computer, Inc. 131
Peer Network 69
Pen Pal Associates 8
Peasant System 79
Pepsico, Ioc. 74
PictureTel Corp. 49
Pilot Software, Inc. 95
Pittsburgh Supercomputing Center 74
Powersoft Corp. 16, 90, 113
Prodea Software Corp. 95
ProTools, Inc. 69
Provident Life & Accident Insurance Co. 71

Q

Quadrant Software 79
Qualcomm, Inc. 83

R

Radio City Music Hall 37
RAM Mobile Data 12
Reliability Ratings 41
Review Associates Cover1
Reynolds Metals Co. 4
Rochester Software, Inc. Cover1

S

S&O, Inc. 6
Saber Software Corp. 107
Samsung Electronics 77
Sandia National Laboratories 71
Seopus Technology, Inc. 69
Seafirst Bank 24
Sequent Computer Systems, Inc. 71
Sequoia Systems, Inc. 77
Sharp Electronics Corp. 16
Snapple Beverage Corp. 74
Software Productivity Consortium 16
Software Publishing Corp. 24
Southern New England Telephone 53
Standard Microsystems Corp. 107
Standish Group 134
Starr Securities, Inc. 77
Steelcase, Inc. 102
StrataCom, Inc. 24
Stratos Computer, Inc. 77
Sun Microsystems, Inc. 4,49,61,63,71,131
Sybase, Inc. 2,37,61,83
Symantec Corp. 37
Systems Compatibility Corp. 46

T

Tandem Computers, Inc. 77
Tektronix, Inc. 71
Telcor Systems Corp. 46
Tele-Communications Association Trade Group. 24
Texas Instruments, Inc. 44
The Chase Manhattan Bank NA 6,90
The Port Authority of New York and New Jersey 8
Thinking Machines Corp. 74
Thomas H. Lee Co. 74
Thomas J. Lipton, Inc. 74
Tivoli Systems, Inc. 4,71
Toshiba Corp. 77
Traveling Software, Inc. 43,64
Tricord Systems, Inc. 90
Tufts Associated Health Plans, Inc. Cover1

U

U.S. Department of Health and Human Services Cover1
U.S. Department of the Treasury Cover1
Unadulterated Food Products, Inc. 74
UnderWare, Inc. 95
Ungermann-Bass, Inc. 8
Unisys Corp. 107
University of Georgia 53
University of Southern California 49
Unix System Laboratories, Inc. 6
US West 24

V

Vantive Corp. 86
Ventana Corp 53
Venturian Corp. 90
Visual Technology, Inc 16

W

Walker Interactive Systems, Inc. 59
Wall Data, Inc. 79
Wang Laboratories, Inc. 8
Watcom 90
White & Cas 61
White Pine Software 16
Wi-LAN, Inc. 134
William Blair Partners of Chicago 131
WilTel 24
Wollongong Group, Inc. 134
WordPerfect Corp. 2,7,107
WorkGroup Technologies, Inc. 43

X

XL/Datacom 79
XPoint Corp. 79
XVT Software, Inc. 95

Z

ZyLab 59

Gainers

Percent

Intervoice Inc.	19.0
Datarand Corp.	17.7
4th Dimension	15.3
Parametric Int'l, Inc.	14.8
Sabal Corp.	13.0
Intelligent Electronics	12.9
Walker Interactive Systems	10.4
Mercer Technology	10.2

Dollar

Wyse Technology	5.38
Lotus Development	3.25
Intel Corp	3.00
Novell Corp. (O)	3.00
4th Dimension	2.75
Tandy Corp (N)	2.50
Platinum Software	2.50
Xilinx	2.25

Losers

Percent

Structural Dynamics Research	-30.6
Borland Int'l, Inc.	-20.3
3 Parallel Computers (O)	-18.7
Gupta	-12.2
Informix Corp.	-12.0
MathSoft (L)	-11.9
McAfee Associates	-11.8
Proteon Inc.	-11.8

Dollar

Structural Dynamics Research	-8.13
DSC Communications (O)	-4.88
Parallan Computer (O)	-4.25
Borland Int'l, Inc.	-3.75
Synoptics Inc.	-3.50
Chipcom Corp	-3.50
Mathematica Electronics (O)	-3.25
Centennial Communications (O)	-3.75

Structural Dynamics has fallen, but can it get back up?

That "bop" you heard in the middle of last week was the sound of investors knocking down Structural Dynamics Research Corp. (SDRC).

Structural Dynamics, a Milford, Ohio, vendor of computer-aided design and manufacturing (CAD/CAM) software, shed nearly a third of its market value after announcing that its third-quarter earnings will fall short of Wall Street's expectations. Its shares fell 5¼ to close at 13⅜ Wednesday.

Although company officials blamed the earnings shortfall on a slight delay in shipping its new Master Series CAD/CAM software, analysts were not quick to predict a rebound. They said Structural Dynamics faces some significant challenges in the fiercely competitive CAD/CAM market.

"We've been negative on the company for a while," said Thomas Rooney, vice president at Donaldson, Lufkin & Jenrette Securities Corp. According to Rooney, growth of Structural Dynamics' strongest market area has slowed, and the firm's core software code is showing its age despite improvements in the Master Series release.

Fred Wolf, vice president at Adams, Harkness & Hill, also advised avoiding Structural Dynamics stock for now.

To regain its former momentum, the company must expand into other CAD functions and markets. However, it is sandwiched between a hot competitor on the front end, **Parametric Technology Corp.** (PMTC), and well-established players on the back end, such as **Computervision Corp.** (CVN).

Computervision's stock is still hanging around the 3 range after its postinitial public offering free fall. However, Rooney said the company should get back on its feet when the European economy turns around. Computervision pulls in about 60% of its revenue overseas.

"Financially, they are very solid since their recapitalization, and they can ride through this European softness with no problem. So it's just a timing issue" as to when the stock will turn upward, Rooney said.

Parametric has largely avoided the stock market tumbles of its competitors and recently hit a 52-week high of 40. Parametric offers a highly intuitive modeling software package, according to Wolf. "If a user is switching from an older CAD system, his first choice is probably going to be Parametric because it's a proveo product," he said.

—Derek Slater

Exch	52-Week Range			Sept. 10 3 PM	Wk Net Change	Wk Pct Change
Communications and Network Services						
OTC	40.00	13.50	3 COM Corp.	25.00	-1.13	-4.3
NYS	88.75	63.38	American Info Techs Corp. (H)	88.75	1.75	2.0
NYS	65.00	40.63	AT&T	40.75	2.00	-3.2
OTC	4.06	0.75	Abtel Communication Corp.	3.13	-0.13	-3.8
OTC	24.50	12.50	Banyan Systems Inc.	19.00	-0.38	-2.6
NYS	64.13	44.50	Bell Atlantic Corp.	44.13	0.25	0.4
NYS	61.13	46.75	Bellsouth Corp. (H)	61.13	1.13	1.9
NYS	14.75	3.63	Bolt, Beranek & Newman	11.25	0.50	4.7
OTC	18.50	9.50	Brooktrout Technology	12.25	0.50	6.3
NYS	119.00	56.63	Cabletron Systems	103.75	-1.63	-1.5
OTC	35.00	6.00	Centigram Communications (H)	31.25	2.75	-8.1
OTC	55.50	20.25	Cipscom Corp.	46.50	-3.50	-7.0
OTC	59.25	24.00	Cisco Systems Inc.	45.75	2.63	-5.4
OTC	10.38	5.50	Compression Labs Inc.	14.00	-0.25	-1.8
OTC	36.00	17.00	CrossComm	26.00	2.00	8.3
OTC	4.63	1.38	Data Switch Corp.	2.63	0.00	0.0
NYS	19.88	12.38	Digital Comm. Assoc.	13.63	0.25	1.9
OTC	12.75	3.75	Digital Systems Int'l. Inc.	4.25	-0.38	-8.1
OTC	67.00	8.75	DSC Communications (H)	61.38	-4.88	-7.4
OTC	9.50	4.75	Fibronics Int'l. Inc.	6.88	0.88	14.6
OTC	24.00	8.75	Fiserv Corp.	14.00	-0.25	-1.8
OTC	4.38	1.50	Gandalf Technologies Inc.	2.50	-0.13	-4.9
OTC	2.00	0.75	Gateway Communications	0.94	-0.03	-3.2
NYS	15.75	3.25	General Datacomm Inds.	10.50	-1.00	-8.7
ASE	3.75	2.00	Go Video	2.56	-0.19	-6.8
NYS	37.75	32.38	GTE Corp.	37.00	0.38	1.0
NYS	94.75	62.75	ITT Corp.	93.50	1.38	1.5
OTC	29.88	16.81	MCI Communications Corp.	27.88	-1.13	-3.9
OTC	6.50	1.50	Microcom Inc.	2.50	0.00	0.0
OTC	24.25	3.50	Netek Corp.	5.00	-0.38	-9.1
OTC	19.00	7.00	Network Computing Devices	7.50	0.25	-3.2
NYS	15.00	5.50	Network Equipment Tech.	8.88	-0.13	-1.4
OTC	20.13	8.00	Network General	12.38	-0.38	-3.9
OTC	15.75	6.88	Network Systems Corp.	8.00	-0.38	-4.5
OTC	27.88	8.19	Newbridge Networks Corp.	66.88	-2.75	-3.9
NYS	46.00	21.50	Northern Telecom Ltd.	27.50	0.50	1.9
OTC	35.25	17.63	Novell Inc.	19.75	0.75	3.9
NYS	95.50	79.00	Nynex Corp. (H)	95.50	3.00	3.2
OTC	30.00	14.50	Octel Communications Corp.	20.50	0.25	1.2
OTC	4.13	3.50	Perrie Data Comm Networks	4.25	0.00	0.0
OTC	30.50	12.50	Picturetel Corp.	17.75	0.38	2.2
OTC	15.75	3.63	Proteon Inc.	4.75	-0.63	-11.6
NYS	37.88	17.00	Scientific Atlanta Inc. (H)	37.13	0.50	1.4
NYS	46.00	31.75	Southwestern Bell Corp.	46.00	0.38	1.1
NYS	37.25	22.25	Sprint Corp.	36.50	-0.75	2.0
OTC	27.00	12.38	Standard Microsystems Corp.	18.88	0.13	0.7
OTC	18.50	9.25	Stratacom Inc.	12.75	-0.25	-1.9
OTC	42.75	12.84	Synoptics Communications	24.75	-1.88	-7.0
OTC	6.63	2.88	Telebit Corp.	4.75	-0.13	-2.6
OTC	14.50	2.50	Telematics Int'l. Inc. (H)	13.38	0.50	2.2
OTC	30.00	15.25	US Robotics (H)	29.75	-0.25	-0.8
NYS	47.75	35.25	US West Inc.	46.75	-0.25	-0.5
OTC	56.00	19.50	Wellfleet Communications	45.00	-2.75	-5.8
OTC	39.50	7.25	Xircom (H)	18.25	-0.50	-2.7
PCs and Workstations						
OTC	5.56	2.50	Advanced Logic Research	3.00	0.00	0.0
OTC	65.25	25.25	Apple Computer Inc.	26.00	0.38	2.0
OTC	24.25	12.75	AST Research Inc.	15.50	0.00	0.0
NYS	9.25	2.88	Commodore Int'l.	3.63	0.00	0.0
NYS	61.75	31.00	Compaq Computer Corp.	57.63	2.25	4.1
OTC	49.88	13.38	Dell Computer Corp.	17.75	-0.25	-1.4
NYS	89.75	50.75	Hewlett Packard Co.	70.38	-2.38	-3.3
NYS	41.00	17.63	Silicon Graphics	39.13	-1.25	-3.1
OTC	41.00	24.00	Sun Microsystems Inc.	27.88	0.38	1.4
NYS	36.25	23.75	Tandy Corp. (H)	36.25	2.50	7.4
OTC	7.00	2.88	Zeos International Ltd.	3.13	0.00	0.0
Large Systems						
ASE	15.13	4.63	Amdahl Corp.	4.94	0.13	2.6
NYS	8.75	3.63	Convex Computer	4.50	0.25	5.9
OTC	6.13	2.25	Cray Computer	3.25	0.13	4.0
NYS	30.88	19.00	Cray Research Inc.	27.75	-0.75	-2.7
NYS	13.88	7.75	Data General Corp.	9.00	-0.75	-7.7
NYS	49.25	30.50	Digital Equipment Corp.	42.75	0.38	0.9
NYS	44.00	28.75	Harris Corp.	40.38	-0.13	-0.3
NYS	88.75	40.63	IBM	43.63	-2.25	4.9
OTC	25.75	5.50	Kendall Square Research (H)	23.25	1.50	6.1
NYS	141.50	83.00	Matsushita Electronics (H)	138.25	-3.25	-2.3
OTC	21.75	8.25	NetFrame	13.00	-0.88	-6.3
OTC	23.50	9.25	Parallan Computer (H)	18.50	-4.75	-18.7
OTC	23.25	6.00	Pyramid Technology	21.25	0.25	1.2
OTC	24.00	11.25	Sequent Computer Sys.	15.25	0.38	2.5
OTC	8.75	1.38	Sequoia Systems Inc.	2.38	-0.25	-9.1
NYS	48.38	20.25	Stratus Computer Inc.	23.88	-1.63	-6.4
NYS	16.88	8.50	Tandem Computers Inc.	10.25	0.38	3.8
OTC	23.50	10.63	Tricord Systems	18.00	-1.25	-6.5
NYS	13.88	7.75	Unisys Corp.	11.38	0.63	5.2
Software						
OTC	37.00	12.63	Adobe Systems Inc.	19.25	-1.50	-7.2
OTC	20.75	10.25	Aldus Corp.	19.00	1.00	5.6
OTC	11.75	5.50	American Software Inc.	7.00	-0.50	-6.7
OTC	28.13	9.50	Ask Computer Systems	11.88	0.63	5.6
OTC	58.75	38.75	Autodesk Inc.	47.25	-1.50	3.1
OTC	8.75	2.50	Bachman Info Systems	3.63	-0.13	3.3
OTC	43.00	28.00	BGS Systems Inc.	30.00	0.00	0.0
OTC	84.13	38.75	BMC Software Inc.	56.63	0.25	0.4
OTC	28.25	18.00	Boole & Babbage	21.50	0.00	0.0
OTC	49.00	14.75	Borland Int'l. Inc.	14.75	-3.75	-20.3
OTC	5.00	2.75	CE Software	2.88	-0.38	-11.5
ASE	40.25	11.16	Cheyenne Software Inc.	35.38	-1.50	-4.1
OTC	19.50	8.25	ChipSoft	15.25	1.25	8.9
OTC	8.88	5.63	Cognos Inc.	8.13	-0.13	-1.5
NYS	32.75	14.50	Computer Associates (H)	30.63	-0.25	-0.8
NYS	11.13	2.75	Computervision Corp.	3.25	0.00	0.0
OTC	34.25	19.25	Compuware Corp.	25.00	-2.25	-8.3
OTC	14.75	5.75	Comshare Inc.	10.00	0.25	2.6
OTC	29.75	10.75	Corel Corp.	29.00	0.75	2.7
OTC	15.25	5.00	Easel Corp.	6.50	0.75	13.0
OTC	25.25	12.00	4th Dimension	20.75	2.75	15.3
OTC	19.50	5.25	Frame Technology	7.75	-0.38	-4.6
OTC	17.50	8.38	Group I Software	9.00	-1.00	-10.0
OTC	35.75	14.50	Gupta	15.25	-2.13	-12.2
OTC	10.25	4.50	Hogan Systems Inc.	9.25	-0.13	-1.3
OTC	25.75	11.25	IMRS	18.63	-2.13	-11.3
OTC	41.75	24.00	Information Resources (H)	41.75	2.00	5.1
OTC	27.25	9.63	Informix Corp.	20.25	-2.75	-12.0
OTC	15.00	8.50	Intergraph Corp.	11.13	0.13	1.1
OTC	13.63	6.00	Interleaf Inc.	6.88	0.00	0.0
OTC	18.00	4.75	Intersolv Inc.	8.63	1.38	19.0
OTC	16.00	2.75	Knowledgeware Inc.	10.25	-1.00	-8.9
NYS	54.75	15.50	Legent Corp.	19.13	-0.75	-3.8
OTC	40.13	14.75	Lotus Development	36.75	3.25	9.7
OTC	23.00	4.50	MathSoft (L)	4.63	-0.63	-11.9
OTC	23.25	4.50	McAfee Associates	8.38	-1.13	-11.8
OTC	11.63	2.38	Meca Software	4.25	-0.13	-2.6
OTC	12.00	5.75	Mentor Graphics	9.75	-0.25	-2.5
OTC	46.00	26.25	Micro Focus	29.00	-0.25	-0.9
OTC	13.25	4.38	Microsoft Inc.	6.25	-0.31	-4.8
OTC	98.00	70.50	Microsoft Corp.	27.00	1.63	2.1
OTC	56.88	18.75	Oracle Corp.	51.13	-1.63	-3.1
OTC	40.00	21.50	Parametric Technology	32.75	-1.75	-4.4
OTC	40.50	22.50	Peoplesoft	32.50	-1.75	-5.1
OTC	7.13	3.75	Phoenix Technologies	6.31	-0.88	-1.4
OTC	40.00	22.00	Powersoft	27.75	0.50	1.8
OTC	38.75	11.34	Platinum Software	28.25	2.50	9.7
OTC	25.00	10.75	Platinum Technology	12.00	-0.38	-3.0
OTC	91.50	32.25	Progress Software Corp.	50.25	0.38	1.0
OTC	7.38	2.56	Quarterdeck Office Sys.	2.75	-0.19	-6.4
OTC	32.00	15.75	Rainbow Technologies Inc.	27.50	0.00	0.0
OTC	13.38	4.00	Rasterops	9.00	-0.63	6.0
OTC	15.25	3.63	Ross Systems	10.75	-0.25	-2.3
OTC	27.75	9.63	Sapiens Int'l. Corp. N.V.	27.25	1.00	3.8
OTC	14.50	5.50	Software Publishing Corp.	7.88	-0.25	-3.4
OTC	14.25	2.63	Softwrpe Tool Works Inc.	13.75	1.00	7.8
OTC	2.75	0.75	Spinnaker Software	1.38	-0.06	-3.8
OTC	13.75	3.25	State of the Art	12.75	-0.50	-3.8
NYS	24.69	15.00	Sterling Software Inc.	23.63	-0.13	-0.5
OTC	21.63	8.00	Structr Dynamics Research	13.88	-6.13	-30.6
OTC	77.30	32.75	Sybase Inc.	57.25	-3.38	-5.8
OTC	18.63	5.88	Symantec Corp.	17.00	0.13	0.7
OTC	25.50	10.00	System Software Assoc.	15.50	-2.00	11.4
OTC	8.38	2.75	Tensic Corp.	4.00	0.00	0.0
OTC	24.25	11.25	Viewlogic Systems	22.25	0.50	2.3
OTC	23.50	5.50	Walker Interactive Systems	6.63	0.63	10.4
OTC	5.19	1.00	Wordstar	1.13	-0.06	-5.3
Semiconductors						
NYS	32.00	10.63	Advanced Micro Devices	28.50	-0.75	2.6
NYS	26.50	9.75	Analog Devices Inc. (H)	26.50	0.38	1.4
OTC	55.00	10.50	Atmel Corp.	52.38	-0.38	-3.1
OTC	8.25	2.75	Chips and Technologies	5.50	-0.13	2.2
OTC	39.75	13.00	Cirrus Logic	26.63	2.00	8.1
NYS	16.75	7.00	Cypress Semiconductor Corp.	14.00	-0.25	-1.8
NYS	19.00	10.50	Dallas Semiconductor	17.38	-0.13	-0.7
OTC	67.25	30.38	Intel Corp.	66.00	3.00	4.8
NYS	19.25	5.50	LSI Logic Corp.	17.75	0.63	3.6
OTC	25.75	31.66	Lattice Semiconductor	24.00	-0.50	-2.0
NYS	54.88	14.38	Micron Technology	56.88	5.25	10.2
NYS	99.13	41.38	Motorola Inc.	93.75	-0.75	-0.3
NYS	20.50	10.13	National Semiconductor	20.50	1.88	10.1
OTC	15.75	6.50	Sierra Semiconductor	7.50	-0.50	-6.3
OTC	51.75	24.75	SynOpsys	49.75	0.00	0.0
NYS	84.25	39.00	Texas Instruments	78.75	1.00	1.3
OTC	19.00	6.38	VLSI Technology (H)	16.75	0.50	3.1
OTC	13.25	2.63	Wyse	12.75	0.50	4.1
ASE	9.63	3.63	Western Digital Corp.	5.00	-0.25	-4.8
OTC	46.25	14.50	Xilinx	44.50	2.25	5.3
OTC	33.00	12.38	Zilog Inc.	31.25	-0.75	-2.3
Peripherals and Subsystems						
OTC	48.00	15.75	American Power Conversion	41.75	2.75	6.7
OTC	20.16	15.50	Barcrec Inc.	18.75	0.00	0.0
OTC	18.50	3.50	Cambex Corp.	4.00	0.00	0.0
ASE	18.50	3.88	Cognitronics Corp.	4.88	0.50	-7.1
NYS	25.50	9.00	Conner Peripherals	20.38	-0.63	-5.2
OTC	38.50	14.00	Creative Technologies Inc.	19.25	2.00	-9.6
OTC	30.75	11.00	Data Race Inc.	13.25	-0.25	-1.9
ASE	13.75	4.75	Dataram Corp.	9.13	1.50	12.7
NYS	95.00	8.00	EMC Corp.	32.00	-0.38	-1.2
OTC	10.38	5.50	Emulex Corp.	5.75	-0.13	-2.1
OTC	19.00	13.25	Evans & Sutherland	17.25	1.00	-5.5
OTC	25.00	2.50	Exabyte	9.65	-0.25	-2.5
OTC	36.00	8.59	Intelligent Info. Systems (H)	32.25	-1.50	-4.4
OTC	8.00	3.38	Iomega Corp.	3.50	-0.13	-3.6
OTC	15.25	5.75	IPL Systems Inc.	8.00	0.00	0.0
OTC	24.00	14.25	Komag Inc.	18.25	-0.25	-1.4
OTC	19.63	6.38	Maxtor Corp.	5.88	-0.13	-2.1
OTC	10.75	5.75	Micropolis Corp.	8.75	-0.38	-6.9
NYS	117.00	97.00	3M Corp.	106.50	1.13	-1.0
OTC	7.75	4.00	Pinnacle Inc.	7.00	0.00	0.0
NYS	17.25	6.88	QMS Inc.	8.50	0.13	1.5
OTC	12.88	9.38	Quantum Corp.	12.50	-0.25	-2.0
OTC	7.13	3.13	Radius Inc.	4.00	-0.25	-4.9
NYS	16.88	9.13	Recognition Equipment (H)	15.88	-0.50	-2.3
OTC	13.00	3.75	Reston Inc.	4.25	-0.38	-8.1
OTC	22.38	12.00	Seagate Technology	19.75	-0.50	-2.5
NYS	45.00	18.00	Storage Technology	30.13	-0.38	-1.2
NYS	27.88	17.63	Tektronix Inc.	24.00	-0.13	-0.5
NYS	88.88	70.25	Xerox Corp.	72.88	0.38	0.5
Services						
OTC	23.75	14.88	*American Mgmt. Systems	17.38	-0.50	-2.8
NYS	4.75	2.38	Analogic Inc.	2.88	0.00	0.0
OTC	35.75	17.75	Analysts Int'l.	33.75	-1.50	4.4
NYS	44.63	29.75	Auto Data Processing	48.88	0.00	0.0
NYS	17.25	13.00	Cerridian Corp.	14.25	-0.38	-2.3
OTC	17.38	13.13	Comdisco Inc.	14.75	0.25	1.7
OTC	11.00	4.38	Computer Horizons (H)	10.50	-0.50	-4.5
NYS	92.25	65.88	Computer Sciences (H)	92.25	0.88	1.0
OTC	9.25	6.00	Computer Task Group	6.75	-0.38	-5.3
NYS	40.50	19.00	CompUSA Inc.	31.88	2.00	6.7
OTC	34.25	7.00	Corporate Software	11.00	0.25	2.3
OTC	12.75	6.63	Egghead Discount Software	7.25	0.13	1.8
NYS	33.88	26.00	General Motors E (EDS)	31.25	-0.63	-2.0
OTC	25.50	10.50	Inacom Corp.	18.75	1.50	7.4
OTC	18.63	8.13	Intelligent Electronics	18.63	2.13	12.9
OTC	15.13	7.13	Mercer Int.	14.38	-0.63	-4.2
OTC	24.50	5.75	Micropro Inc.	23.00	0.75	3.4
OTC	33.00	18.00	Paychex	31.25	0.00	0.0
NYS	97.25	21.63	Policy Management Sys.	25.25	1.00	4.1
NYS	43.63	20.75	Reynolds and Reynolds	39.88	-1.38	-3.2
OTC	19.00	12.00	SEI Corp. (N)	18.00	-1.00	-5.3
OTC	24.38	17.50	Shared Medical Systems	22.13	0.13	0.6
OTC	12.63	5.75	SHL Systemhouse	9.75	-0.25	-2.5
OTC	30.75	20.00	Software Spectrum Inc.	26.75	0.50	1.9
OTC	40.25	23.75	Syncard Data Systems (H)	40.25	2.50	6.6
NYS	4.38	1.13	Ultimate Corp.	2.88	0.00	0.0

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

Copyright Nordby International, Inc. Louisville, CO
This information is based or sources believed to be reliable, and while extensive efforts are made to assure its accuracy, no guarantees can be made. Nordby International and Computerworld assume no liability for any inaccuracies. For information on Nordby International's Data-On-Demand services for any of the above companies call Nordby International at (800) 926-7404.

Second class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-4841) is published weekly except 6 issues in August and 8 single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1993 by CW Publishing/Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased through the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $6.00 a copy; U.S. — $148 a year; Canada — $181 a year; Central & So. America — $150 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

Briefs

Toolmakers meld

Bachman Information Systems, Inc. in Burlington, Mass., last week said it intends to acquire client/server tool developer **Cooperative Solutions, Inc.** in San Jose, Calif. The deal will be completed by the end of this year, pending approval by Bachman's board of directors, among other things. Both companies have been experiencing some financial distress, industry analysts said, and the acquisition may help both because their application development tool sets are complementary.

Sun, Axil, HEA settle

Sun Microsystems, Inc. has settled a suit it filed in April against **Axil Workstations** and its parent **Hyundai Electronics America**. The suit charged a former Sun employee with misappropriation of Sun trade secrets in the design of certain Axil Scalable Processor Architecture-compatible systems. Among other things, Axil has agreed not to make any more Axilstation 230 or Axil HWS-310 products. It may sell a portion of its old inventory. No financial details were disclosed.

Lotus sells unit

Lotus Development Corp. has sold its **One Source Division** to a new firm owned by the division's management and employees and two venture capital firms: **Information Partners of Boston** and **William Blair Venture Partners of Chicago**. Lotus will retain a minority investment in the new entity. Other terms of the deal were not disclosed.

SHORT TAKES Holders of common **Parallan Computer, Inc.** stock that was subject to lock-up agreements have been released from those agreements. . . . **Gartner Group, Inc.** has acquired the outstanding stock of **New Science Associates, Inc.** Both market research firms are based in Westport, Conn.

McAfee pushes beyond virus market

CEO steps into chief technologist role as firm readies acquisition strategy

By James Daly
SANTA CLARA, CALIF.

Like Blanche DuBois in *A Streetcar Named Desire*, John McAfee has always relied on the kindness of strangers.

In an era of highly competitive software pricing battles, the 46-year-old founder of McAfee Associates, Inc. has built one of the most successful makers of antivirus software in a highly ironic fashion — by giving the software away.



John McAfee: *'One step at a time. Right now we've got our hands pretty full'*

The company makes its money — about $19.4 million in 1992 at a 70% pretax operating margin — by collecting licensing fees from companies that download its highly regarded file scanning and disinfection software off an electronic bulletin board. The companies like it so much they voluntarily buy a site license.

McAfee typically charges approximately $3,000 for a 100-machine license. The end result is more than 7 million registered machines — out of roughly more that 10 million — running licensed copies of programs such as Scan, Clean, VShield and Seotry.

Despite McAfee's success so far, Wall Street has not exactly embraced the company's stock. It was offered at $16 on its first day of trading last October but bad fallen more than 40% to $9 as of late last week.

While other companies mull jumping on the bandwagon, the controversial McAfee, who recently handed the chief executive officer reins to Bill Larsoo (see story below), is oow looking beyond virus technology into a greater realm of software, all of which will, of course, be electronically distributed.

"We have to get over this idea that I have to hand you software in a box," said McAfee, who is still chairman and now chief techoology officer. "Software is simply electrons, and if you make it strictly an electronic prodoct, you free it from the things that not only slow down its distribntioo but make it cost so much to produce."



Price of doing business

Meta Group, Inc. in Westport, Conn., claims that a business with 1,000 PCs will spend approximately $50,000 annually for the distribution of one bug fix, two application upgrades and one operating system upgrade. That estimate is based on labor costs of $40 per hour with an estimate of 20 minutes per PC upgrade.

Avoidable costs?

These "things" include having to encode floppy disks, wrapping and boxing packages and then shipping those boxes. Slowdowns on the user side include the time involved in disseminating those boxes to, and manually upgrading, each oode as well as the storage required to house all those packages.

Some analysts said this potential for huge profit-making may push software companies into electronic distribution. "A chance to save a little money can be a very convincing way of getting people to change," said Lenny Siegel, director of the Pacific Studies Center, a Mountain View, Calif., public interest information center.

When antivirus packages can be distributed quickly and opdated as often as every 60 days, the continually evolving area of virus control, in particular, benefits a great deal. This is especially important at corporate sites, which typically find upgrading applications to be a big headache.

Acquisition mode

The next phase in the company's expansion process is already under way. Earlier this year, the company signed a letter of intent to acquire shareware database developer Buttonware, Inc. in Bellevue, Wash. The purchase price was not disclosed.

McAfee said be plans to electronically distribute the Button database and all of Buttonware's future products. For the time being, be said, his namesake company will distribute only its own products and those of any acquisition. There is oo plan to compete with any software retailers moving into the same market or with any vendors, such as IBM, that distribute some prodocts over electronic bulletin boards.

"One step at a time," McAfee said. "Right now we've got our hands pretty full."

McAfee steps out of the spotlight . . . for now

Recent executive shuffling at McAfee Associates has raised a few eyebrows, given the flamboyance sometimes associated with founder, Chairman and former CEO John McAfee.

The company last month recruited Bill Larson to take over McAfee's CEO post. Larson was vice president of sales and marketing at SunSoft, Inc. McAfee, in turn, was dubbed the firm's first CTO.

The plan is for Larson to sell an expanding product suite as McAfee looks for acquisition candidates while "rolling up my sleeves and getting back into doing what I love — developing new technologies," he said.

That is the official company line, anyway. Some security industry veterans speculated that the move was designed to get McAfee out of the limelight.

The highly public McAfee is about as controversial a fellow as any in the computer security industry. He became well-known nationally during the Michelangelo scare in early 1992 when he predicted that the virus could irretrievably alter data on "anywhere from 50,000 to 5 million" DOS-based PCs worldwide.

McAfee's call was merely a warning flag, but when the number of PCs incurring damage turned out to be lower — an estimated 20,000 to 40,000 PCs worldwide — the long knives were drawn by those who said McAfee made the security software industry look like a pack of Chicken Littles.

McAfee has also come under heavy criticism in recent years for spending more time hyping the virus scare than attending to his products.

"One is still left with the impression that the [Scan] program . . . could benefit from more attention to function and less to the promotion of the services of McAfee Associates," wrote author Christopher Fendo in *The Computer Virus Desk Reference*.

That was not the only bump in the road. In February, users of McAfee's Clean utility discovered a bug that could render the hard disk of a user's PC inaccessible.

Several weeks before that, a federal judge in Richmond, Va., ordered the company to stop distributing its Pro-Scan Version 2.31 and Virwatch Version 2.33 applications because they were inaccurately identifying some commercially available software packages as virus-infected.

—*James Daly*

Wysiwyg

From our readers' files: Favorite jokes

Q What do you get when you cross Lee Iacocca with a vampire?

A AUTOEXEC.BAT

Q What did the mountain climber call his hiking boots?

A CTL-ALT-DELETE because they are warm boots.

Donald Dunn
Carmichael, Calif.

From our readers' bookshelves: Favorite books

Atlas Shrugged
By Ayn Rand

The author presents an integrated philosophy that shows what the world could be like if the philosophy were widely practiced. The book illustrates how the failure to practice it has caused the mess we have today.

Software Reliability
By Glen Myers

With scope and depth, this book identifies how our software methods, hardware and software tools influence the production of high-quality software. Tragically, this book is almost totally ignored by the industry in the mad rush to embrace the cost-cutting fad du jour, for example, "open systems."

Mark Wallace
Los Angeles

DO YOU HAVE ANY GOOD INDUSTRY JOKES, OR HAVE YOU SEEN OR HEARD ANYTHING ABOUT THE INDUSTRY THAT YOU WOULD LIKE TO SHARE? CONTACT STEFANIE MCCANN, PHONE (800) 343-6474, FAX (508) 875-8931, MCI MAIL 591-8021.

The 5th Wave *by* Rich Tennant



"WELL, HECK—I CAN'T STEP AWAY FROM THE COMPUTER FOR A SECOND WITHOUT YOU BIRDS GETTIN' ALL RUFFLED ABOUT IT."

Inside Lines

Wireless whizzes along

Canadian start-up Wi-LAN, Inc. in Calgary, Alberta, plans to drop a 20M bit/sec. wireless LAN bombshell at the Networld '93 Dallas show early next month, a company spokesman said. The speed would nearly quadruple today's airwave-based LANs, which top out at 5.7M bit/sec., and surpass the data transfer rates of today's wired Ethernet and Token Ring LANs. The Ethernet-compatible product is slated to sport built-in encryption and ship early next year.

Parallel views

And at Unix Expo next week, IBM will show off two applications running on its Parallel Server for AIX. The Oracle relational database will be used to show IBM's parallel processing system as a database server. A data modeling package from Quantum Software Development Corp. will highlight the parallel system as a compute server.

Here's the beef

This week, IBM will finally put some product beef into SystemView with the announcement of LAN NetView, a source close to the company confirmed. IBM is rapidly converging the SystemView system and network management architecture with the Distributed Management Environment. LAN NetView, which manages Token Ring and a range of clients, will comply with SystemView's object-oriented data model, GUI and dual SNMP and CMIP support. IBM will also detail how some of its other network management products — NetView/6000, for example — will become more SystemView-compliant.

Crossroads

Like lots of software developers, IBM is wrestling with which version of the Win-32 application programming interface it wants to support on top of OS/2. Right now, IBM is leaning toward supporting the full Win-32 API, but Lois Dimpfel, director of Personal Operating Systems, said IBM may opt to initially support the Win32S kit, which sacrifices some features to support both 16-bit and 32-bit Windows applications. Supporting 32-bit Windows apps on OS/2 will be an easier proposition because the multitasking services that those applications expect to see are already in OS/2, she said.

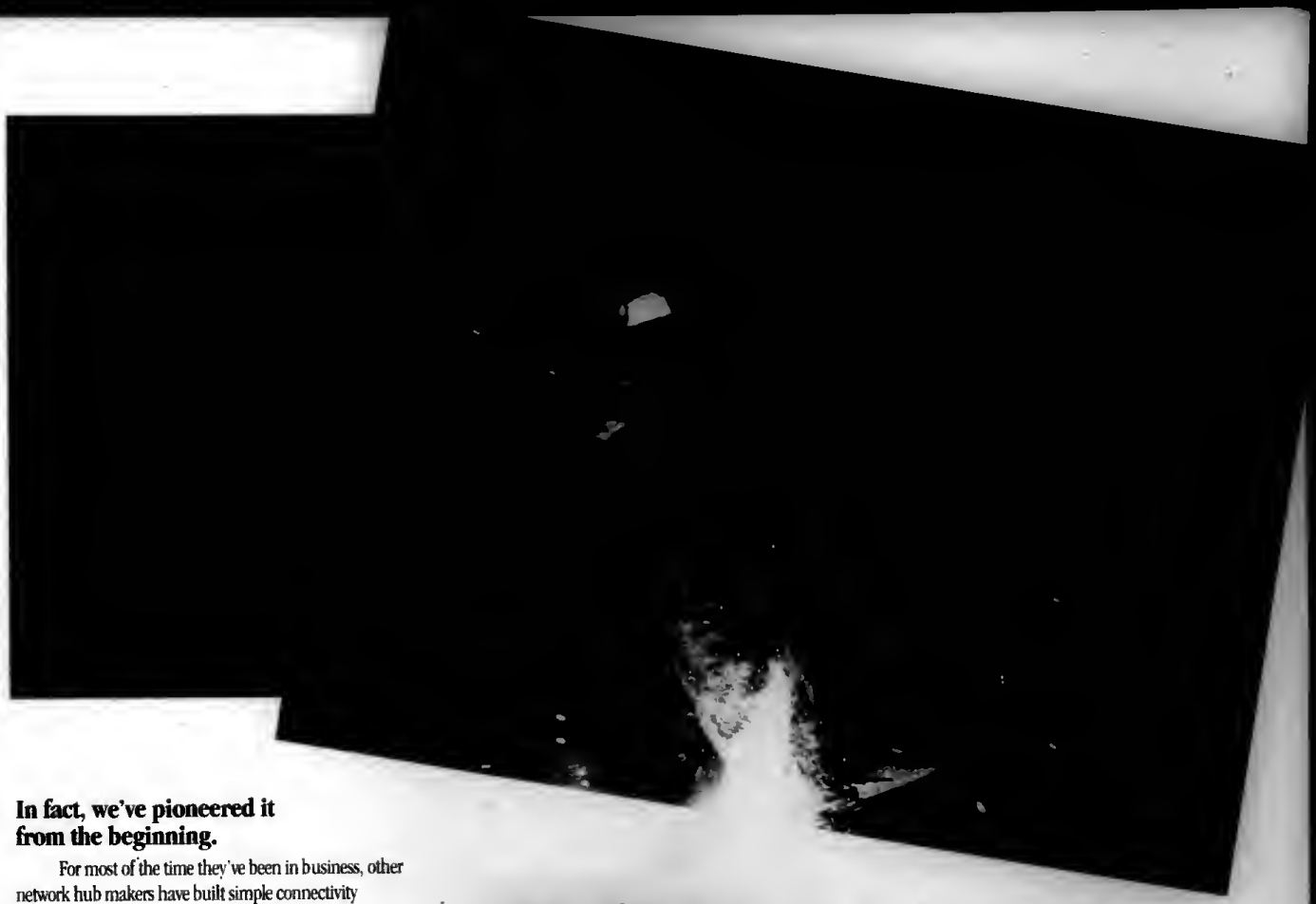
Paging Rmon

Next week, Network General is expected to deliver on its 6-month-old promise to support the remote monitoring (Rmon) LAN diagnostic and monitoring standard. Look for Novell's distributed Rmon strategy for its NetWare Management System to debut at Networld next month.

Channel changing

ComputerLand Chairman Bill Tauscher last week sold his franchise and Datago distribution organization to Intelligent Electronics, which beat out distributors Marisel and Ingram Micro, according to sources close to the company. Sources said ComputerLand is selling the franchise operations, which are the most profitable part of the company, because investors are tired of waiting for an initial public offering.

The Transaction Processing Council (TPC) has voted to close the loophole that Oracle slipped through with its controversial "discrete transaction" database benchmark [CW, July 19]. When last we left the storm, Oracle had published extremely high performance ratings using a skimpy, functionally limited version of its database. Standish Group consultants called the benchmark "fraudulent," and Oracle sued. Now the TPC has prohibited vendors from running any so-called benchmark specials that only pump up ratings and don't benefit users in real world situations. Come June 1994, all vendors that have run TPC-A and TPC-B numbers have to stop using them for sales and marketing. Phone, fax or CompuServe News Editor Alan Alper with news tips at (508) 343-6474, (508) 875-8931 or 76587,3413, respectively. Or try Computerworld's 24-hour voice-mail tip line at (508) 820-8555.



In fact, we've pioneered it from the beginning.

For most of the time they've been in business, other network hub makers have built simple connectivity devices for departmental LANs.

But Chipcom got its start in the brutal environment of the factory floor. Big factory floors. From our very beginning, we created the equipment needed to reliably hold together large, mission-critical networks for big companies.

We realized very early in the game that building a vast network was one thing: Controlling it was another. And we also recognized that as entire enterprises became networked, the problem would become even more critical.

Which is why we were the first to turn to switching, and why we have been the leaders in switching technology ever since. Whether a particular application requires modular, bank,



port or segment-switching, Chipcom has the solution. And as ATM looms ever closer, Chipcom's cell-switching abilities will be ready for it.

It's been

Chipcom switching technology makes true enterprise networking a reality.

No other maker of intelligent hubs offers you the vast array of switching capabilities that Chipcom delivers.

No other line of hubs gives you the ability to engineer an enterprise-wide network with the rock-solid reliability, ease of management and control, and flexibility to handle continued change and growth as Chipcom does. And because our roots were planted in the world of big, far-flung networking, our underlying architecture has always assumed bigness. So you never have to scrap your earlier Chipcom investment as you grow.

When you're thinking big, you should be thinking Chipcom.

When a well-known retailer with over 2,000 stores decided to network their entire operation, they chose Chipcom. A large petrochemical company with refineries in six western states made the same choice. A major insurance company with thousands of offices across the U.S. investigated every hub makers' products before they selected Chipcom.

Hundreds of manufacturing companies, financial institutions, universities and government agencies have learned that if you're building a small network, you have a number of choices. But if you're thinking big, there's only one: Chipcom.

To learn what Chipcom switching technology can do for your organization, call **1-800-228-9930** and ask for your free copy of *Network Switching Solutions*. After all, if you're smart enough to realize what switching can do for your organization, you're smart enough to want to talk to the people who pioneered it.

Network Switching Solutions

CHIPCOM

GS00K93AGS6439

Chipcom is a registered trademark of Chipcom Corporation.

© 1993 Chipcom Corporation, Southborough Office Park, 118 Turnpike Road, Southborough, MA 01772



Rapid application development isn't simply a goal. It's survival.

Staying competitive depends on delivering applications fast. That's why more software developers depend on Borland tools. Borland lets you choose the tool that best fits your need. Use award-winning languages like Borland® C++ and Borland® Pascal to develop custom applications in record time. Integrate these seemlessly with database applications built using Paradox® and dBASE.® Plus Quattro® Pro, Borland's top-rated Windows spreadsheet, has database and custom application development tools built right in. ■ Borland tools give you the best in object-oriented design. So they produce code that is reusable and extensible, saving time and money on revising and extending your applications. ● From DOS and Windows to the 32-bit sophistication of OS/2,® Borland gives developers the tools to build applications that run your business. Find out how well they can work for you. **Call 1-800-321-3217, ext. 7013, today!**



Borland
Power made easy

Copyright © 1993 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. BI 5669